Serial V.10
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TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION,

AT ITS

TENTH ANNUAL MEETING,

Held at Nashville, Tenn.,

AUGUST 2nd TO 5th, INCLUSIVE, 1870.

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The American Dental Association, although formally accepting and publishing the reports of the various Standing Committees, and the essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise ordered by special resolution.—*Constitution.*

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MINUTES OF THE TRANSACTIONS.

BY M. S. DEAN, SEC.

FIRST DAY—MORNING SESSION.

THE American Dental Association commenced its Tenth Annual Session at the Hall of the House of Representatives, Nashville, August 2, 1870, at 10 o'clock, A. M. Dr. Homer Judd in the chair.

The meeting was opened by prayer offered by the Rev. Dr. Summers.

Dr. W. H. Morgan, Chairman of the Committee of Arrangements, delivered an address of welcome in the name of the citizens and Dentists of Nashville, and was followed by Dr. C. K. Winston, on the part of the Physicians of the place.

Dr. Baird, in behalf of the State Dental Association, also addressed the meeting.

The roll was called, and the following named members were present:

Jas. S. Knapp, Wm. H. Goddard, J. A. Arrington, Homer Judd, R. Russell, S. H. McCall, J. Taft, W. H. Morgan, W. H. Shadoan, I. A. Salmon, Will Taft, G. L. Field, S. B. Palmer, Geo. H. Cushing, M. S. Dean, J. R. Walker, L. D. Shepard, E. A. Bogue, H. J. McKellops, S. J. Cobb, C. D. Cook, Isaiah Forbes, G. W. Keely, H. A. Smith, Corydon Palmer, D S. Dickerman, J. B. Coolidge, S. P. Cutler, J. C. Ross, H. E. Peebles, W. W. Allport, W. F. Morrill, G. A. Mills, J. A. McClelland, P. G. C. Hunt, J. N. Crouse, W. H. Atkinson, Sen. B. Brown, C. M. Wright, John Allen, J. B. Morrison, F. W. Dolbeare, W. G. Cummings.

The following were *absent*, but sent *their dues:*

C. S. Stockton, I. J. Wetherbee, A. Colton, A. B. Robbins, J. H. Smith, L. C. Wheeler, J. R. Draper, E. Honsinger, J. F. Adams, E. F. Barnes, W. A. Bronson, A. L. Northrup, Jas. McManus, J. G. Ambler, P. Sloan, Frank Abbott, M. L. Chaim, F Peabody, C. F. Wheeler, W. C. Adams, Edgar Park, E. S. Holmes, J. H. McQuillen.

New Delegates:

W. O. Kulp, R. N. Lawrence, L. Augspath, R. R. Freeman, J. W. Moffitt, T. C. Stellwagen, J. P. Holmes, B. B Alfred, A. C. Ford, Thos. T. Moore, W. C. Dyer, E. S. Gaylord, J. P. H. Brown, J. Fouché, C. P. Baird, C. C. Carroll, L. C. Chisholm, R. J. Porre, W. H. Burr, M. Corcoran, E. Floyd, J. L. Mewborn, S. W. Dennis, W. A. Jones, E. A. Herman, E R. E. Carpenter, S. H. Beard, E. C. Sloan, J. G. Willis, Alexander Hartman, C. R. Taft, P. Sloan, L. T. Gunn, W. P. Hall.

The reading of the minutes of the last annual session was called for by the President, but on motion of Dr. Bogue, was dispensed with.

Report of the Committee of Arrangements was called for, and further time granted.

Committee on Publication granted further time.

Committee on Prize Essays called. No member present. On motion of Dr. J. Taft, the vacancies in the above committee were filled, the President appointed Drs. Taft, Kulp and Walker.

Committee on Dental Physiology called. No member being present, on motion, the chair appointed Drs. Cutler, Cushing, and Crouse to fill the vacancies in that committee.

Committee on Dental Chemistry called, and further time granted.

Report on Dental Pathology and Surgery called for. No answer.

Committee on Operative Dentistry called, and further time granted.

Committee on Mechanical Dentistry called. No report.

Committee on Dental Education granted further time.

Committee on Dental Literature granted further time.

Committee on Voluntary Essays called. No report.

On motion, the vacancies in the last named committee were filled, by the appointment of Drs. McCall and Fouché.

Committee on Histology allowed further time.

Dr. Peebles offered the following, which was adopted:

WHEREAS, There may be, and probably is, a goodly number of bound volumes of the "Annual Transactions" of the American Dental Association, that have not been distributed among the members of the Association; and

WHEREAS, These said volumes are in the hands of the several "Publishing Committees," subject to the ordinary casualties of deterioration or destruction; and

WHEREAS, There may be, and doubtless there are those in the profession, who are non-members of this Association, who would be glad to procure a set of these "transactions," if put on sale at a fair price, therefore

Resolved, That a committee of three be now appointed by the chair, to enquire into this matter, ascertain how many, and where such volumes are, and report the same to this meeting, with such suggestions as they may deem proper on the subject.

Drs. Shepard, Taft, and Dean were appointed by the President, as the committee under the above resolution.

On motion of Dr. Shepard, it was resolved that all physicians, clergymen and lawyers, residing or visiting in the city, be hereby invited to seats in this body during its session.

On motion of Dr. Bogue, the published programme of the Committee of Arrangements was adopted, as the order of business during the session.

On motion, the chair appointed Drs. Walker, Ford and Peebles, to fill vacancies in the Committee on Instruments and Appliances.

On motion of Dr. Shepard, it was resolved that the "order of business," from 5 to 11 inclusive, be passed over, it being the intention of the committee that this portion of the business be transacted during the last days of the session. Carried.

Adjourned to 3 o'clock, P. M.

FIRST DAY—AFTERNOON SESSION.

Association met at 3 o'clock. President in the chair.

The minutes of the preceding meeting were read, corrected and approved.

On motion of Dr. Cushing, the Association returned to the regular order of business.

Dr. Morgan, Chairman of the Committee of Arrangements, reported the following persons as qualified delegates from their respective societies. Report adopted.

Prof. H. Judd, Missouri Dental College.
Dr. Isaiah Forbes, Missouri State Dental Association.
Dr. John W. Moffitt, Lebanon Valley Dental Association.
Dr. W. C. Dyer, Chicago Dental Society.
Dr. W. H. Shadoan, Kentucky State Dental Association.
Dr. H. E. Peebles, Missouri Dental College Association.
Dr. Thos. T. Moore, South Carolina State Dental Association.
Dr. E. Floyd, Southern Dental Association.
Dr. R. N. Lawrence, Southern Dental Association.
Dr. W. O. Kulp, Iowa State Dental Association.
Dr. John Fouché, East Tennessee Dental Association.
Dr. J. C. Ross, Tennessee State Dental Association.
Dr. W. H. Burr, Southern Dental Association.
Dr. Thos. C. Stellwagen, Philadelphia Dental College.
Dr. E. A. Herman, Nashville Dental Association.
Dr. S. B. Palmer, Fifth District, New York Association.
Dr. C. C. Carroll, Lake Erie Dental Association.
Dr. R. R. Freeman, Nashville Dental Association.
Dr. J. R. Walker, Southern Dental Association.
Dr. G. H. Cushing, Illinois State Dental Society.
Dr. B. B. Alfred, Georgia State Dental Society.
Dr. J. S. Knapp, New Orleans Dental Society.
Dr. A. C. Ford, Georgia State Dental Society.
Dr. M. S. Dean, Chicago Dental Society.
Dr. C. P. Baird, Tennessee State Dental Association.

Dr. S. C. Chisholm, Tennessee State Dental Association.
Dr. J. P. H. Brown, Georgia State Dental Association.
Dr. E. C. Sloan, Ohio State Dental Association.
Dr. E. S. Gaylord, Connecticut State Dental Association.
Dr. C. D. Cook, Brooklyn Dental Society.
Dr. S. P. Cutler, New Orleans Dental College.
Dr. J. R. Porre, St. Louis Dental Association.
Dr. C. Palmer, Forrest City Society of Dental Surgeons.
Dr. J. G. Willis, Mississippi Valley Dental Association.
Dr. D. S. Dickerman, Boston Dental College Association.
Dr. S. W. Dennis, California State Dental Association.
Dr. W. F. Morrill, Mississippi Valley Dental Association.
Dr. G. A. Mills, Brooklyn Dental Society.
Dr. E. R. E. Carpenter, Illinois State Dental Society.
Dr. W. A. Jones, St. Louis Dental Association.
Dr. S. H. Beard, Tennessee State Dental Association.
Dr. S. B. Brown, Indiana State Dental Association.
Dr. G. W. Keely, Mississippi Valley Dental Association.
Dr. J. L. Mewborn, Tennessee State Dental Association.
Dr. C. R. Taft, Ohio State Dental Association.
Dr. Michael Corcoran, Missouri State Dental Association.
Dr. J. P. Holmes, Southern States Dental Association.
Dr. L. Augspath, Southern States Dental Association.
Dr. Alex. Hartman, Tennessee State Dental Association.
Dr. J. B. Morrison, St. Louis Dental Society.

Committee on Publication granted further time.

Committee on Prize Essays re-called, no report.

Committee on Physiology granted further time.

Committee on Pathology and Surgery called, and the Chairman, Dr. Atkinson, made a report, which was partly written and partly verbal.

Voluntary Essays on that subject being called for, the committee reported one paper in their hands, but did not state whether it properly belonged under that head, or was of sufficient value to the Association to be read.

Dr. Cobb moved that it be read. Carried.

Dr. Morgan moved a re-consideration of the vote.

After considerable discussion, the paper was rejected, not however, on the grounds that it was not a meritorious article, but as emanating from an outside source.

The subject of Pathology and Surgery was resumed and discussed by Dr. Cutler, until 6½ o'clock, when the meeting adjourned, to meet at 9 o'clock the following morning.

SECOND DAY—MORNING SESSION.

The Association met at 10 o'clock. President Judd in the chair. Prayer was offered by the Rev. Dr. Young.

On motion of Dr. Shepard, the reading of the minutes of the preceding session was postponed.

The following letter to the President, was read by the Secretary:

CINCINNATI, July 4th, 1870.

PROF. H. JUDD, *President American Dental Association:*

DEAR SIR—Here, and now is resigned into your hands, as its chief executive officer, the undersigned's membership in the American Dental Association.

Having participated in the preliminary measures resulting in the formation of the Association, having joined it in its infancy, having received its highest honors the first day of my membership, having been entrusted with some of its heaviest responsibilities and most important duties, and having received from its members, generally, brotherly kindness and courtesy, it is not strange if this step is taken with reluctance. But the Association is now strong, and this withdrawal can not injure it; and the time has come that I can do it more good outside than inside.

Believing my accounts square on the Treasurer's books,

I am, yours,

GEO. WATT.

On motion, the resignation tendered in the above letter, was accepted by the Association.

The resolutions by Dr. Peebles, which follow, were adopted:

WHEREAS, It is patent to our profession, that great ignorance obtains among American mothers, regarding the eruption and development of the teeth of their children; and,

WHEREAS, Such ignorance is one of the main causes of the loss of many teeth, and especially so of the 6th year molars; and,

WHEREAS, To remedy this great evil, will require a thorough and early course of rudimental instruction; therefore,

Resolved, That a committee of three be appointed by the chair, whose duty it shall be to correspond with the publishers of American school books, and ascertain if some plan can be devised to have short, plain statements of the number, name, form and arrangement of the several teeth in the deciduous and also in the permanent sets, and incorporated in the text books.

Resolved, That the committee be, and is hereby authorized, to make all the necessary arrangements with the said publishers of school books, to carry out fully the idea embraced in the preamble and first resolution, and report to the next annual meeting of this Association.

Drs. Peebles, Fouché and Dennis, were appointed to carry out the object set forth in the resolutions.

On motion, Drs. Kulp and Cobb were added to the above committee.

The subject of Pathology and Surgery was re-called by the President, and discussed by Drs. Cutler, Walker, Judd, Willis, Palmer, Allen, Morgan, Jones, Holmes, Crouse, Moffitt, Forbes, Peebles and Atkinson.

On motion, the vacancy in the Committee on Ethics was filled, by the appointment of Dr. J. S. Knapp.

A letter of invitation was received from J Berrien Lindsley, M. D., requesting the members of the Association to visit the museum of the Medical College. Accepted, and 2½ o'clock set apart for that purpose.

Dr. Crouse moved, that 12 o'clock to morrow, be the time fixed for the purpose of determining the next place of meeting. Lost.

Adjourned.

SECOND DAY—AFTERNOON SESSION.

The Association met pursuant to adjournment. President Judd in the chair.

Minutes of the two preceding sessions read and adopted.

On motion, the vacancies in the Committee on Mechanical Dentistry were filled by the President, by the appointment of Drs. Wright, Moore and Floyd.

Discussions on Dental Pathology and Surgery were continued by Drs. Cushing, Taft, Cutler, Morgan and Willis.

On motion of Dr. Shepard, the subject was passed.

On motion, the subject of Dental Chemistry was re-called, and a report read by Dr. John Allen.

The subject was discussed by Drs. Cutler, Peebles, Allen, Allport, Dickerman, Morgan, Carroll, Knapp, Chisholm, Stellwagen, Crouse, Walker, Peebles, Forbes, Cobb, Dennis, Taft and Bogue.

On motion of Dr. Crouse, it was resolved that when the session adjourn, it be to meet at 10 o'clock, to-morrow morning, at which time the subject of Operative Dentistry be taken up.

Drs. Crouse, Kulp, Knapp and Porre, were appointed Clinical Operators for the next morning.

Adjourned.

THIRD DAY—MORNING SESSION.

Association convened pursuant to adjournment. The President in the chair.

The meeting was opened with prayer by the Rev. Dr. Baird.

Minutes of the preceding meeting read and approved.

The subject of Operative Dentistry was opened by an able and exhaustive report by Dr. G. H. Cushing, and followed by two voluntary essays, one upon "Cylinders" and the other on "The saving of time in Dental operations," by J. S. Knapp.

The Committee on Voluntary Essays reported one paper in their hands, on the subject under consideration, from the pen of Dr. Frank Abbott, which on motion was read by the Secretary.

The President announcing the subject of Operative Dentistry open for discussion, Drs. Knapp, Peebles, Carroll, Morgan, Fouché, Bogue, Dennis, McKellops, Walker, Dean, Dickerman, Allport, Cushing, Forbes and Mills participated in the discussion.

Dr. Crouse, moved that an evening session be held at 8 o'clock, and that the first business shall be the selection of the next place of meeting, and the second, the election of the officers of the Association for the ensuing year. Carried.

A letter was received from J. H. Callender, Superintendent of the Tennessee Hospital for the Insane, inviting the Association to visit that Institution at their convenience. Accepted.

Adjourned to meet at 3½ o'clock.

THIRD DAY—AFTERNOON SESSION.

The Association was called to order at 4 o'clock. Dr. Taft in the chair.

The minutes of the previous meeting read and approved.

The Committee of Arrangements submitted the following nominations for Standing Committees for the ensuing year, which after subsequent alterations were elected as follows:

STANDING COMMITTEES.

Committee on Publication—M. S. Dean, W. W. Allport and Geo. H. Cushing, Chicago, Ills.

Dental Physiology—Homer Judd, St. Louis; Thos. C. Stellwagen, Philadelphia; L. Augspath, Helena, Arkansas.

Dental Pathology and Surgery—W. H. Atkinson, New York; J. R. Walker, New Orleans; W. H. Morgan, Nashville, Tennessee.

Committee on Chemistry—T. L. Buckingham, Philadelphia; C. C. Carroll, Pennsylvania; J. G. Willis, Cincinnati.

Operative Dentistry—J. S. Knapp, New Orleans; H. J. McKellops, St. Louis; P. G. C. Hunt, Indianapolis.

Mechanical Dentistry—John Allen, New York; W. H. Eames, St. Louis; S. B. Palmer, Syracuse; C. M Wright, Cincinnati; B. B. Alfred, LaGrange, Georgia.

Dental Education—G. A. Mills, Brooklyn, New York; S. J. Cobb, Nashville, Tennessee; L. D. Shepard, Boston.

Dental Literature—Geo. H. Cushing, Chicago; R. N. Lawrance, New Orleans; J. N. Crouse, Chicago.

Voluntary Essays—S. H. Beard, Murfreesboro, Tennessee; C. D. Cook, Brooklyn, New York.

Dental Histology—W. W. Allport, Chicago; J. H. McQuillen, Philadelphia.

Dental Therapeutics—H. S. Chase, St. Louis; E. A. Bogue, New York; T. T. Moore, Columbia, South Carolina; C. P. Baird, Tennessee.

Instruments and Appliances—J. B. Morrison, St. Louis; I. A. Salmon, Boston; S. W. Dennis, San Francisco, California; Corydon Palmer, Warren, Ohio.

Prize Essays—I. Forbes, St. Louis; J. P. H. Brown, Georgia, W. C. Dyer, Chicago; A. C. Ford, Atlanta, Georgia; J. W. Moffitt, Harrisburg, Pennsylvania.

Dental Ætiology—J. Taft, Cincinnati; S. P. Cutler, New Orleans; R. W. Varney, New York; W. O. Kulp, Iowa.

The subject of Operative Dentistry was continued by C. Palmer.

Drs. C. Palmer, McKellops, and Salmon were appointed operators for the morning clinics. Adjourned.

THIRD DAY—EVENING SESSION.

The Association convened at 8½ o'clock. President in the chair.

The special order of business for the evening was an-

nounced to be the selection of the next place of meeting, and the election of officers.

Drs. Knapp and Cobb favored another annual session in the South.

Dr. Mills advocated the claims of California.

Dr. Carpenter favored an excursion on lake Superior.

Dr. Cushing preferred California, if the rates of fare can be made reasonable, otherwise he would favor some more central place.

A motion to limit the speakers to two minutes prevailed.

Drs. Dennis and Allport spoke in favor of California.

Dr. Ford spoke of the advantages of Atlanta and the claims of the South.

Dr. Moore advocated White Sulphur Springs, Virginia.

Dr. Stellwagen and others favored the East.

Dr. Crouse favored a central place where the Association can be attended by the greatest number, at the least expense and inconvenience. This place he thought was Niagara Falls.

On balloting, Atlanta was selected as the next place of meeting.

Dr. Allport moved that a committee of seven be appointed to secure reduced fares to and from the next place of meeting. The following were appointed on said committee by the President:

H. E. Peebles, St. Louis; Geo. H. Cushing, Chicago; S. W. Dennis, San Francisco; J. H. McQuillen, Philadelphia; I. A. Salmon, Boston; J. R. Walker, New Orleans; John Allen, New York.

The election of officers was now declared the next business in order, and the result of the ballot was as follows:

President—W. H. Morgan, Nashville, Tenn.

1*st. Vice-President*—S. W. Dennis, San Francisco, Cal.

2*d. Vice-President*—J. R. Walker, New Orleans.

Corresponding Secretary—I. A. Salmon, Boston.

Recording Secretary—M. S. Dean, Chicago.

Treasurer—W. H. Goddard, Louisville.

EXECUTIVE COMMITTEE.

The following were elected for the term of three years: Geo. H. Cushing, Chicago; J. Taft, Cincinnati; J. S. Knapp, New Orleans.

For the term of two years—W. W. Allport, Chicago; E. A. Bogue. New York; Isaiah Forbes, St. Louis.

For the term of one year—S. J. Cobb, Nashville; A. C. Ford, Atlanta; J. P. H. Brown, Georgia.

At the meeting held by the Executive Committee, Dr. J. Taft was elected Chairman, and Geo. H. Cushing, Secretary, and the committee subdivided as follows:

1*st Division*, *Committee of Arrangements*—Drs. Cobb, Ford and Brown.

2*d Division*, *Credentials and Auditing Committee*—Drs. Allport, Bogue and Forbes.

3*d Division*, *Committee on Nominations and Volunteer Essays*—Drs. Cushing, Taft and Knapp.

Adjourned.

FOURTH DAY—MORNING SESSION.

The Association met pursuant to adjournment. President Judd in the chair. Meeting was opened with prayer by the Rev. Dr. Wharton.

Dr. Crouse offered the following resolution which was adopted:

Resolved, That the Treasurer is hereby instructed to notify each permanent member of his dues, and collect the same as soon as possible, that he may be in funds to honor all drafts drawn upon him.

Dr. Morgan, chairman of Committee of Arrangements, presented an additional report which was withdrawn by consent, as the matter to which it referred was otherwise provided for.

Dr. Goddard, moved that the resolution of Dr. T. L. Buckingham, which was announced at the last annual meeting, to amend the Constitution so as to exclude from member-

ship in the Association, all patentees or persons pecuniarily interested in patents, be adopted. This was opposed by Drs. Dean and Kulp, and the motion lost.

Dr. Shadoan offered the following resolutions, which were adopted:

Resolved, That the thanks of this Association are due to all railroad companies who have so generously extended half-fare arrangements to the members of this Association who are in attendance, especially are the thanks of the Association due the Louisville & Nashville Railroad Company, for liberality in our behalf.

Resolved, That the thanks of this Association are especially due to M. Keen & Co., proprietors of the Maxwell House, for their generosity in reducing the fare to the members and families of this Association.

Resolved, That the thanks of this Association are due the press of the city, for the active interest taken in, and services rendered this Association during this meeting.

Resolved, That the thanks of the Association are due the clergy of the city, for their interest in the deliberations of the meeting.

Resolved, That the thanks of the Association are due the Tennessee State Legislature, for the use of this beautiful and well adapted hall, for the use of the Association during this meeting.

Dr. Mills concluded his remarks on Operative Dentistry, and was followed by Drs. Knapp, Dickerman and Forbes.

Dr. Walker presented the following formula for metallic dental plate, which he claims "will make sharp castings of any desired form and thickness which answers every purpose better than rubber:"

Bismuth, 1 part; pure tin, 15 to 20 parts, according to the degree of hardness desired.

TREASURER'S REPORT.

Wm. H. Goddard, Treasurer, in account with American Dental Association.

1869.	Dr.	1869.	Cr.
Aug. To balance	$16 05	By paid voucher No. 1,	$152 80
" cash dues for 1865,	3 00	" " " " 2,	50 00
" " " " 1866,	10 00	" " " " 3,	50 00
" " " " 1867,	65 00	" " " " 4,	62 00
" " " " 1868,	100 00	" " " " 5,	9 50
" " " " 1869,	645 00	" " " " 6,	4 50
" sale of two copies Transactions, 1868,	6 00	" " " " 7,	100 00
		" " " " 8,	350 00
		" " " " 9,	7 00
	$845 05		$785 80
1870.		Balance	59 25
Aug. To balance	$59 25		
			$845 05

Examined and found correct,

W. W. ALLPORT, ISAIAH FORBES, } *Committee.*

WM. H. GODDARD, *Treasurer.*

Drs. Atkinson and Stellwagen followed on the subject of Operative Dentistry.

Dr. Crouse moved, that after giving Dr. Palmer 10 minutes to show his instruments, the subject of Operative Dentistry be deferred until all the other Reports and Essays shall have been read, which motion prevailed.

Dr. Palmer having occupied the time given, it was further extended, in order that he might explain more fully his principles.

Dr. S. B. Palmer read a Report on Mechanical Dentistry.

Drs. Dean and Crouse and Dr. Cobb, presented the Reports on Dental Education. The subject was discussed by Drs. Allen, Taft, S. B. Palmer and Crouse.

Dr. Shadoan, moved that the discussions on the various papers be taken up in order, after all shall have been read. Carried.

Dr. Dean read the following report of the Publication Committee, which was adopted:

Your Committee on Publication respectfully submit the following report:

Four hundred copies of the Transactions of the American Dental Association for the year 1869, have been published, at the expense of $380 00.

One hundred and thirty-two of these have been distributed to those reported by the Treasurer as entitled to the same, by the payment of their dues. Eleven copies the Chairman has sold at $1 25 each, to Dentists not members of the Association. Besides three or four copies presented to persons not belonging to the profession, but interested in our specialty—the balance is in the hands of the Committee;—twenty-six of which have been brought to this place of meeting.

Two hundred and fifty copies of the new Constitution, in a neat pocket edition, have been published at the expense of $17 00.

The committee have employed a very able phonographic reporter, Thos. O. Summers, A. M, who furnishes copy of the proceedings of this session, for the sum of $80.

The account of the Publication Committee with the Association, is as follows:

1870.	American Dental Association to Publishing Committee,	Dr.
	To Printing and binding 400 copies of Transactions	$380 00
	To wrapping paper, and wrapping copies for mail	3 50
	To 250 copies pocket edition, Constitution	17 00
	To postage on Transactions	20 50
	To expressage to Nashville	2 20
		$423 20
	Cr.	
	By cash from Treasurer	350 00
	Balance due Committee	73 20

M. S. DEAN,
E. A. BOGUE,
J. TAFT. } *Publication Committee.*

Dr. Morgan presented the following report from the Committee of Arrangements, after which it was moved and seconded that the Treasurer be drawn on for the balance due the Committee, as shown in the report:

Your Committee of Arrangments would report that this Hall was procured free of cost, the Legislature granting its use to the Association.

They would also recommend that the following accounts be paid:

Printing, etc., per Morgan	$19 50
" " per Cobb	14 50
" " per W. H. Shadoan	2 00
	$36 00

Dr. Moore presented the following amendment to the Constitution, which lies over under the rule:

"Hereafter no person shall become a member of this Association, who holds a Dental patent, or who may hereafter become pecuniarily interested in such patent."

Dr. Forbes offered the following resolution, which was adopted:

Resolved, That the members are requested to bring with them, at the next annual meeting, such pluggers and excavators as they have in general use, so that when presented to the Committee on Instruments the Committee may be enabled to make up a complete set, containing no more instruments than are necessary.

Dr. Crouse moved that the Treasurer be drawn on for the salaries of the Secretary and Treasurer. Adopted.

Dr. Ford presented the following resolution, which on motion, was laid on the table:

The delegations from the Georgia State Dental Society, and the South Carolina State Dental Association, beg leave to submit the following resolution, as adopted by said Societies, for the consideration of this Association:

Resolved, That this Society instruct their delegates to the American Dental and Southern Dental Associations, to request said Associations to appoint committees to petition Congress to appoint Dentists in the army and navy of the United States.

ARTHUR C. FORD,
B. B. ALFRED, } *Georgia.*
W. H. BURR,
THOMAS T. MOORE, *South Carolina.*

Dr. Allport moved that no miscellaneous business be taken up until the papers were disposed of. The motion prevailed.

Dr. Judd, Chairman of the Committee on Histology, read a very able report on that subject.

On motion of Dr. Shadoan, the vote fixing the next place of meeting at Atlanta, was re-considered, and Niagara Falls was selected instead. The time of adjournment having arrived, the Association adjourned to meet at 3 o'clock.

FOURTH DAY—AFTERNOON SESSION.

The Association met according to adjournment. President Judd in the chair. The minutes were read, corrected and approved.

Dr McCall moved to reconsider the vote by which the place of the next meeting was fixed at Niagara Falls. Carried, and White Sulphur Springs, Virginia, was the place finally determined upon for the next meeting.

Dr. McCall presented a report from the Committee on Voluntary Essays, which was accepted.

Dr. Morgan presented the following report from the Committee on Dental Ethics. Adopted:

Your Committee on Ethics would respectfully beg leave to report that they have carefully investigated the charges against Dr. J. A. McClelland of unprofessional advertising, and find him guilty on his own admissions with mitigating circumstances. They would recommend that he be allowed five minutes in which to defend himself before this Association.

W. H. MORGAN, *Chairman.*
JAS. S. KNAPP.

Dr. McClelland was allowed five minutes to defend himself against charges of unprofessional conduct. Not being present, it was ordered that he be permitted to take that time at his convenience.

Dr. Kulp offered the following resolution which was carried:

Resolved, That a committee of three be appointed, who shall prepare a circular upon popular education, and furnish the profession copies for popular distribution, at a rate of expense sufficient to cover expenses of publication.

Drs. Kulp, Walker, and Peebles were appointed.

Dr. McClelland addressed the Association in defense of the charges preferred against him, and was allowed ten minutes to finish his defense. On motion, the explanation was regarded satisfactory.

Dr. Walker read the report from the Committee on Instruments and Appliances, which was accepted.

Dr. Goddard moved that the new President be inducted in office. After the minutes were read and approved, Drs. Taft and Atkinson were appointed to conduct him to the chair. On being introduced by Dr. Taft, Dr. Morgan made a few appropriate and feeling remarks before taking the chair.

Dr. Judd, on retiring, thanked the Association for the courtesy extended to him as their presiding officer, and for the uniform kindness with which he had been treated by its members.

Dr. Atkinson moved that the thanks of the Association be tendered to the retiring officers, and especially to the late President, for the dignified and efficient manner with which he has presided over the Association. Adopted.

Dr. Cushing read a letter from J. W. Clowes, in relation to Dr. Barnum's early experiments and final success with the rubber dam.

On motion of Dr. Cushing, the Corresponding Secretary was instructed to frame an appropriate resolution of thanks to Dr. Barnum, for his generous gift to the profession, which was adopted.

Dr. Allport moved, that the Association present a medal to Dr. Barnum, the expense of which Drs. Allport, Cushing

and McKellops proposed to bear. On motion of Dr. Cook, the proposition was accepted.

Dr. Dickerman, made a motion, which was thus amended by Dr. Forbes:

Resolved, That in consideration of the great benefit conferred on the profession, by the gift of Barnum's rubber dam, the sum of one thousand dollars be appropriated to him from this Association. Adopted.

Dr. Atkinson moved, that the Publication Committee be authorized to make the best arrangements possible with the Dental journals in reference to publishing the transactions of the Association. Adopted.

Dr. Forbes moved, that in consideration of the distance which Dr. Dennis of California had come to attend this meeting of the Association, twelve copies of the transactions of last year be given him, to distribute among the members of the profession where he resides. Adopted.

The following amendment to the Constitution was proposed by W. H. Goddard:

"To amend Article IV of Constitution.

The regular meetings of the Association shall be held annually, at such time and place as shall be designated by vote of the Association, at its preceding meeting."

Dr. Shadoan offered the following:

Resolved, That this Association appoint a delegate to the Southern Dental Association, at Charleston. Adopted.

It was moved and carried, that the President appoint the delegate to said Association.

The committee appointed to report upon the Transactions still in the hands of the various Publishing Committees, would report that they find the number now on hand to be as follows:

For 1865-6,	probably	200
For 1867,	"	200
For 1868,	"	300
For 1869,	"	150

The committee recommend that the various committees be authorized to place on sale, the volumes in their possession, at such places as they may select, at the following prices: For the large volumes, $1 50 each; and for the others, $1 00. Adopted.

Dr. McClelland tendered his resignation to the Association, which was accepted.

It was moved to adjourn, to meet at White Sulphur Springs. The motion was withdrawn, and Dr. Atkinson occupied the time until 7½ o'clock discussing the details of Operative Dentistry. At the hour above named, the Association adjourned, to meet at Greenbrier, White Sulphur Springs, Virginia, the first Tuesday in August, 1871.

ADDRESSES OF WELCOME.

The first address was delivered by W. H. Morgan, as follows:—

I arise to bid you sincere welcome to the capitol of Tennessee, and to the hospitalities of its citizens. We are proud that Nashville was selected as the first place of meeting in the South since your organization, and we shall strive by our courtesies and hospitalities to prove that the selection was a judicious one.

Gratitude should fill our hearts that so many of us under the superintendence of a kind Providence, have been permitted to meet again. Only one of our members has fallen during the past year; let us drop a tear of sympathy over his ashes, and permit his absence on this occasion, to impress anew on our hearts, the lesson of our mortality. Let us prepare when our labors are accomplished, to follow him to the beautiful beyond. When I look around me, sir, upon the earnest, honest faces present, and reflect that they have come from their far distant homes, not in search of honor nor emoluments, I am proud of you, love you, for your unselfish devotion to science and truth. I will venture the assertion, Mr. President, we are to-day, taken as a class, the livest set of men on the face of the earth.

That we have a larger proportion of earnest investigators, earnest seekers after truth, men who love science than can be found elsewhere among our race.

Look, sir, at those around you, who would not be impressed by such a body of men? A distinguished statesman of Massachusetts, when addressing this association, once said: I am not only impressed by the general appearance of this body, but I am impressed by their individuality.

The favorable circumstances under which we meet, are very suggestive to many of us of this city. We are taken back to the days when there was no such thing as professional intercourse among the Dentists either of this city or country, and the progress we have made in the last twenty years, is brought vividly to our minds, with the pleasant reflection of the many and inestimable benefits we are prepared to confer on suffering humanity. Then, again, a little while ago we could not have so met in this magnificent hall, all was confusion and dread anxiety. In the halls and along the corridors was heard the clank of the dragoon's sabre and the rattle of the captives chains; the hills around trembled beneath the tread of more than a hundred thousand armed men, as they rushed from tent to deadly conflict, and this quiet valley of the Cumberland reverberated with the sound of hostile cannon, and men stood aghast as they heard it die away among the rocks and crannies of the distant hills, like the wail of some expiring demon.

Thank God, sir, these scenes are all past. The storm cloud of war has been driven from our horizon, and the angel of peace again hovers above us, giving assurance of quiet and security to this broad land. We meet as brethren from every section, for the purpose of promoting the interest of our calling, the interest of suffering humanity. Let us not permit any side issue to occupy our time, but let us devote the short time allotted us together, to the elimination of truth and the spread of scientific knowledge. We need not care for localities or sections. What should it matter to me, sir, whether you were born among the granite hills of the far distant North, or that you first looked out upon the light of day on the plains of the far West, or heard the first soft lullaby of mother, amid the magnolias and orange groves of the far sunny South. Are you a lover of science? Are you devoted to Dentistry? Then you are my brother, with you, as such, I am prepared to make the balance of life's short journey.

But I will not occupy your time further, as there are others more gifted than myself to follow. Permit me again, in the name of the Dentists of Nashville, and the citizens of Tennessee, to welcome you to her capitol.

The next by Dr. C. K. Winston, M. D , in behalf of the Medical Profession of Nashville, and the Faculty of the University, who said :—

Mr. President and Gentlemen of the American Dental Association: I have been authorized by the Faculty of the University of Nashville, and the profession at large, to extend to you that welcome, which as a profession, you so richly deserve, and to introduce you to the urbanity and hospitality of the city in which you hold your present meeting.

You have come from various portions of our land—from the Kennebec and Penobscot to the Rio Grande—from Maine to California—a band of brethren united for the amelioration of the condition of your suffering race. Whatever estimate you may place upon the *honorarium* of your profession, I am fully persuaded that your view in coming together—the pregnant cause of your meeting, is to lessen the pains and sufferings of your race, and I am proud to believe that the day is not far distant, when to have a tooth extracted will prove an exquisite pleasure.

I know of no set of men who are deserving of more encomium than *Dentists.* I can remember the time when Dentistry existed only as a common trade, just as the tinkers of olden times. What is it now? How is it now, Mr. President? Not only have you almost perfected it and beautified it as an art, but you have erected upon a firm pedestal a most noble science. It is no longer a rude art, but a science of distinguished proportions, and an art which is not excelled.

You have come together, too, a band of men knowing no North, no South, no East, no West. How could I do otherwise than welcome you? I wish I had language that

would express the emotions that now fill my heart. That has been better done by Dr. Morgan, who has preceded me, who is an honor to your profession, and a blessing to his race. I will not detain you long, but I wish to say that I am proud to believe that you have elevated your profession, until it has become part and parcel of the medical science. You are no longer mere mechanics, but scientific gentlemen of distinction. We welcome you *a nomine fratrum.* We are kinsmen, the same blood courses through our veins, and we are banded together to assuage the pain and suffering of the human race, from which only the grave can free it. Another point—the Dental profession sheds a flood of light on many points which have heretofore existed as the *approbria medicorum.* I have often said that the growth and development of the teeth, played a wonderful part in the healing of disease. I could bring up case after case to prove this, the *punctum saliens* of your profession. You look deeper into this than we.

I once saw a cancer which had resisted all treatment, both of physician and charlatan—a dentist cured it in *five minutes.* I saw a woman wasting under consumption, and regarded as doomed to die. Her teeth were extracted, and now she walks the streets of Nashville, with as blithe a step and as agile as any young lady in the city, and in addition to that, wears a beautiful set of pearls. I will not, however, detain you longer. For these reasons, sir, on the part of the medical profession, I extend to you a cordial welcome. I thank you, gentlemen, for your kind attention.

C. P. Baird, M. D., D. D. S., next spoke in behalf of the Tennessee State Dental Association, and said:—

Mr. President and Gentlemen of the American Dental Association: I stand before you as the representative of the Tennessee Dental Association, and extend to you such a welcome, as every Tennesseean's heart is ever ready to offer, as a sweet oblation upon the common altar of our noble profession.

And here I would call the attention of all before me, representing the professions of dentistry and medicine. Yes, of Divinity, too, to that which I shall advance as a type of our union to-day. In reading, my attention was lately called to a description of the Gulf stream. And from the Western coast of Africa, we find it rolling forth through the mystical depths of the sea, to the far off ice clad regions of the North, far eclipsing the "Father of Waters." What do we find suggestive in this? In this great stream, the genial climate of the South is represented, and as it carries forward the caloric which it gathers from its Southern shores, up to the frozen seas of the Arctic circle, the great rocks of ice come tumbling down, mingling with the caloric of the South, and both becoming one grand totality. In this do we see one of the sublimest pictures. The frozen North, and the genial South in this stream, meet in happy exchange And we are told by some writers that ten thousand times ten thousand myriads of shining insects go dashing through this stream, acting like so many beacon lights, to guide the weary seamen to their desired harbor of rest. This bears a striking analogy to our profession. Gentlemen, this morning have we not a Gulf stream? Have we not professional tapers that mark out our vessels course?

I see before me a representative from the Golden Gate of California, and we extend to him a brothers hand, and feel, as it were, that a "nation had been born in a day." And we see our old friend from the Crescent city, and would hail him as a zephyr of springtime, freshly laden from the orange grove. And we also see on our right hand, to-day, our faithful friend from the classic city of Boston, and we greet him with a hearty welcome too.

So may we co-mingle the current of our thoughts and feelings, and be the better for having met together on this occasion.

Again, gentlemen, I extend to you a cordial welcome.

REPORTS AND DISCUSSIONS.

REPORT ON DENTAL PATHOLOGY AND SURGERY.

BY W. H. ATKINSON, CHAIRMAN.

PATHOLOGY.

Pathology in the large sense includes all functional activity, whether of an healthy or diseased character. In the differential sense it has been restricted to the latter.

All apprehension of difference of health and disease is but the perception of the phases of production, destruction, and reconstruction of bodies and processes, in equation of presentment in health, and predominance of or tendency to overbear this equation, or balancing of processes in disease.

The constitution of a body, out of which arises the possibles in temperament and diathesis, must be understood to enable an observer to recognize harmonious and inharmonious play of plan and process in the functions of forming and maintaining in place the primates of which the body or process is composed.

Bodies are formed, fed, and worked upon a plan, by a process, for an end or purpose, whether they be planets, plants, or peoples, in mineral, vegetable, or animal modes of presentment.

Differentiation.—Without orderly arrangement of points of likeness and unlikeness in bodies and processes, we can have no intelligible standard of differences.

All the observations capable of being made without optical instruments are coarse and ambiguous; and hence the classification of bodies thus discernible is vague and unscien-

tific, as the text-books of natural history abundantly prove.

Since the perfecting of the microscope, naturalists have broken camp on the old battle ground of germs and species, and transferred their opposing onslaughts to that of class and kingdom.

The characteristic of germs and species has ever been unmeaning and occult, but that of class and kingdom is even less conclusive and less clear.

The cataloguing of any character of sameness, likeness or unlikeness involves a process of perception, which is itself the product of the mechanism of sense, by which that which perceives elaborates the sentient process, or the perception.

Essential or necessary conditions are posited at the avenues of sense as guards against error and misjudgment resulting upon the misunderstanding of any part or the harmony of the entire and complete process of perception of fact and philosophy.

Aberrant action of any sense, or conjunction, or ellipsis of one or more senses, vitiates, obscures, aborts or prevents the mental conclusion. The complete conclusion of fact and philosophy, or the demonstration, as it has been called, can only occur by wedding the territories of matter and mind.

That this may clearly appear, it is only necessary to state —mental labors or events occur in *consciousness*, and physical or bodily events occur in *space*.

How shall we untie without cutting this gordian knot, of bringing together in consentaneous harmony these as yet parallel lines, infinitely projected and hence rigidly indifferent? The catagories of primates in consciousness and physics may be thus annotated or tabulated, viz:

Consciousness has as basis or ground, mind, spontaneity, force.

Physics has as basis or ground, matter, space, effect.

The wedding of all these seeming indifferents in the territory of *time* completes the conditions of individual existence. *Existence*, then, being the mutual saturation of three posi-

tives and three negatives, namely: mind, spontaneity, force, and matter, space, effect, may be regarded in finite or infinite degrees.

Individual *ex*-istence as an infinite is incomprehensible; but as an infinitude of infinitesimals composing the universe in the great sense, is the only rational basis of realty of bodily presence.

All bodies must come into existence out of the unpronounced oceans of force and form, in accordance with the limitations of these in the type upon which they are built.

This involves necessity of production and maintenance, which simply means creation or procreation, growth and nutrition. This last word nutrition involves the idea of change in the constituents of the body or bodies that elaborate function. And just here is the point in which all the past has been more or less at fault in interpretation of the where, the when, the how of function.

Function is the performance of process, whether that be mental or material, and each must partake of the other to constitute it function at all. So it becomes apparent that all of science and philosophy depends upon the appearance and disappearance of oneness and diversity throughout the whole range of cognizable being and not being, or existence and non-existence of presence, or in other words the metamorphoses occurring in planets, minerals, plants and animals, in the multifarious process of feeding and being fed, from world to bathybius the extremes of hardness and softness between which anthropology makes its advent to explain the whole.

In the main the differentiations that mark slightest dissimilarity of a diatom or some infinitesimal body has engaged the attention of naturalists and microscopists, thus tarrying in thinnest matters of detail, and spending whole lives in building up unimportant differences into impassable barriers to all but those who were able not only to follow but transcend these wonderful hair splitters.

Why should the asserted identity of appearance under the microscope of an air bubble and a globule of mercury be a stumbling block in the way of the veriest novice, only that superficial observers have laid down a superficial authority which dominates so many who are essaying to study microscopy from books?

The power to differentiate is evidently an endowment of mind, and the mind is the concurrent result of all means of perception; is the full play of all the senses in normal action.

The senses acquaint us with the qualities of things. That is to say, resistance is the primal necessity to the sense of feeling.

Solution is the prerequisite to taste, fineness of division or volatility to smell, vibration to hearing, and impact of light to sight, each retaining the essential condition of contact specialized in accordance with the differential necessities of each mechanism to metamorphose touch into idea, thought, opinion, belief, and knowledge by which we become informed upon the various subjects which engage our attention.

If, then, as is now apparent, we can only exercise complete powers of body and mind by being in possession of them, and also having a consciousness of that possession to enable us to exercise them in specific direction, how absolutely necessary is it that this exercise voluntary and spontaneous be untrammeled, regular, full and free in every department, and in the entire rounding out of demonstration of indisputable knowledge! Every effort at systemizing the greatest and minutest differences with which natural science has thus far been favored has fallen in the main far short of this clearness of demonstration, and hence we are and have been overloaded with mere detail and crudities, that will continue to obstruct true progress so long as these remain uncancelled and unarranged.

And now let us propound the basis upon which the future structure of natural science must be built to attain the clearness sought: 1st, crystal; 2d, cell; 3d, body; out of which the

three kingdoms or domains naturally take their origin, and upon which they are firmly set. To understand the mineral dominion, *chrystalosophy* must be the field of study. If we would comprehend the vegetable domain we must make a differential study of *cellosophy*. Both of these are necessary to introduce us into the domain of *corpusculosophy*, which defines the measure of endowment of the animal.

Crystalosophy, *cellosophy*, and *corpusculosophy* constitute the tripod upon which natural philosophy may now stand erect as their embodiment and assertion in the complete dominion of matter and mind as interdependent necessities of substance and force.

Investigators of natural phenomena may be divided into two distinct classes of observers, namely, the *ex*clusives and *in*clusives.

The *ex*clusives have held the field from the earliest times, and still hold it in all accepted teachings of the books and the schools.

The *in*clusives have been so few and obscure as to have been overslaughed or ignored in every age; the exclusives appropriating their labors and clipping them of their real significance and greatest use by differentially cataloguing them as their own.

The two great examples of exclusives holding control of the domain of natural philosophy are nominated physicists and vitalists, neither allowing the other the credit that each lays claim to, hence the irrepressible conflict of the war now waging between them, only to be settled by the *in*clusives taking the field and showing the necessity, utility and harmony of both aspects of this unity in diversity displayed in physical and vital phenomena.

"Observers" are limited by their *powers*, and "investigators by their *means*.

If we would clearly understand this, we must be able to define and propound both "powers" and "means."

The ultimate power of observation is nothing less than

consciousness, hence our consciousness will be clear and definite, or clouded and indefinite, in accordance with the completeness or incompleteness of our mental machinery.

In the strict sense, then, this machinery is a "means" of consciousness, but not the only means; for appliances and apparatus belonging to optics and mechanics are also essential "means" by which our "powers" are increased and made definite in extent and certainty.

Orderly arrangement of observations, then, may be said to constitute investigation when legitimately compared.

The order of impressions becoming completed consciousness or knowledge must be known before we can by possibility differentiate legitimacy from its opposite.

This order will be more clearly apprehended by explaining a diagram representing the several stages of mental labor, from inception to culmination of the process, by which alone we can possibly know!

EXPLANATION OF THE DIAGRAMATIC SECTION OF A HUMAN SENTIENT CENTRE.

A sense of deficiency (need) represented in the diagram, in the centre, by an ellipse, induces the mind to throw itself into an aspirational attitude, this induces "*inspiration*," represented by a dot at the top of the diagram in the outer space; when it impinges upon the mental sphere it comes in a direct line toward the centre and indents the periphery of the mental sphere, setting up waves which are equally propagated on either side of the point of incidence of the inspiration, which proceed around the entire sphere until they meet, crest to crest, at the opposite point of the sphere or section; the rebound of the waves causes them to retrace the territories just traversed, and when they meet at the point of starting they emerge as "*feeling*," symbolized by the wavy curved lines seen in the centre of the concentric spheres of the figure. "*Feeling*" makes its advent into the next concentric sphere, and passing a similar gestational activity, traverses the plane of its labor and emerges as "*idea*," represented by an arrow-head with the point of the shaft to which it is attached.

In like manner of incidence and gestational activity, the mental process is continued, the completed idea emerging in the next concentric sphere as "*thought*," represented by an arrow-head and shaft, with one pair of plumules near the posterior end of the shaft.

Thought, passing the metamorphosis of mental gestative action, becomes "*opinion*," as it emerges into the next sphere toward the centre, which is symbolized, like thought, with the difference of having two pairs of plumules on the shaft of the arrow.

Opinion, passing another stage, becomes belief upon its emergence into the next space, and is now born into that degree of mental conviction denominated "*belief*," and is represented or symbolized by an arrow, with three pairs of plumules on the hinder part of the shaft.

By a continuance of the mental impulse, belief now becomes in its turn resolved into "overpowering perception of truth" or "*knowledge*" in the innermost of the spheres, and is symbolized by a complete sphere in the centre.

This describes normal mental labor; but many who are distressed with the painful sense of "*deficiency*" are not able to convert or have it converted into "*sufficiency*," by passing regularly through the necessary stages. Deficiency and sufficiency are the extreme states or conditions of mental acquisition, and are representations of emptiness and fullness of the mental receptacles.

When "aspiration" is irregular or feeble, the "inspiration" that is sent to satisfy the desire strikes the mental sphere obliquely, and thus propagates the gestational waves unequally, and hence if they are able to produce "feeling," it will be so one-sided as to prevent its becoming metamorphosed into a regularly formed "idea," so abortion of the inspiration takes place, or if it have vigor enough even in its irregular personality to beget a "thought," "opinion" or "belief," it is sure to be a miscarriage, preventing its being born into "knowledge."

Feebleness of "*sense of need*" always is followed by a feeble aspiration which fails to impregnate the sphere by inspiration entering the plane of feeling with a sufficient impetus to continue to completeness of the evolutionary process, in becoming alternately the differential stages of know edge in feeling, idea, thought, opinion, and belief.

It is this feebleness of conviction, of deficiency (ignorance), that has ever stood in the way of the masses, learners and teachers, and the whole world of would-be scientific men, and caused them to tarry in the meager acquisitions of the past; resting satisfied with mere reiterations of loosely and inanely accepted affirmations and gratuitious pronouncements of vagaries for explanations, rather than earnestly doing the mental work requisite to their understanding, or intelligently accepting past or present demonstrations of truth and philosophy.

Section of *A CHART OF* UNIVERSAL ANALOGIES

DESIGNED BY WM. FISHBOUGH

DIATONIC SCALE

PRISMATIC COLORS

RED · ORANGE · YELLOW · GREEN · BLUE · INDIGO · VIOLET

THE REALM OF SENTIENT BEING OR THE ORGANIC GENESIS OF THE SENSES

NATURAL STAGES OF SOCIAL PROGRESS

PROGRESS OF THE RELIGIOUS IDEA

MARITAL RELATIONS

THE UNIVERSAL OR GRAND MAN

FEET · LEGS · THIGHS · ABDOMEN · THORAX · HEAD

RADIATA — TOUCH — STELLARIA, GRINOIDIANS, INFUSORIA, POLYPIARIA, PROTOZOA, BATHYBIUS

TRANSITIONS — MOLLUSCA, ENTVALVES

ARTICULATA — TASTE — MARINE ANIMALS WITH BI-LATERAL ORGANS, BIVALVES, CEPHALOPODA AND TENTACULAR MOLLUSCA

FISHES — SELF MONOCULAR SIGHT — GELATINOUS VERTEBRATES, IN MAN-ONE SIDED VIEWS OF QUESTIONS

AMPHIBIA — HEARING, SEXUAL SENSE — FROGS, TOADS, SALAMANDERS, CHIANS

BIRDS — SMELL — SERPENTS, AERIAL ARTICULATA, SAURIANS, TORTOISES

MAMMALIA — MARSUPIALS

MAN — BINOCULAR VISION, COMMON SENSE, REASON, INTUITION, SPIRITUAL COMMUNE, HEAVEN OR EARTH, SPIRITUAL, SOUL & SPIRIT OR GHOST

SAVAGISM — BRUTE FORCE, ACTION, SPRING OF INDIVIDUALISM, WILD ISOLATED OR

BARBARISM — CLANSHIP AND TRIBAL CONSOCIATIONS OR SPRING OF ACTION, CUSTOM OF THE CLAN.

DESPOTISM — FORCE AND FEAR ACTION, SPRING OF

CRUDE REPUBLIC — CULTIVATED CONSOCIATED INDIVIDUALISM OR EQUAL JUSTICE, GOLDEN RULE, SPRING OF ACTION.

ASCENDING REPUBLIC — AMELIORATION, PROGRESS

HARMONIC REPUBLIC — GRAND MAN, SOCIETY, ASPIRATIONS, AND PURITY

FETICHISM — INDISCRIMINATE

POLYTHEISM — CHANGEABLE

SOVEREIGNISM — A GOD TO BE FEARED AND PLACATED BY SACRIFICES; A GOD OF POWER AND ARBITRARY RULE BUT NOT WELL DEFINED MORAL ATTRIBUTES

POLYGAMY — WOMAN AS THE WEAKER ESTEM THE INSTRUMENT OF MAN'S LUST

JEHOVISM — OPPRESSED AND JUDGE OF DISTINCT MORAL ATTRIBUTES, BUT SA DEFENDER OF THE POOR AND OPPRESSED, JUSTICE AND JUDGMENT THE HABITATION OF HIS THRONE

TRANSITION — PLURALITY OF WIVES DISPENSED BY GOD MANIFESTED IN THE FLESH NATURE, SUBORDINATED TO SPIRIT, PROHIBITED BUT NOT DIVORCE PERMITTED WITH RECOGNITION OF RIGHTS OF WIFE

MONOGAMY — CONJUGIAL

PATERNISM — THE FATHER AND MAN THE GOD MANIFESTED IN THE FLESH (CHRISTIANITY) — CHILD, GOD

EMANUELISM — RECOGNISED PRECEPTS OF GOD IN HUMAN INSTITUTIONS, SCIENCE AND OTHER

D KBOTIFJ

D STANDS FOR	DEFICIENCY	SYMBOL ○
I " " "	INSPIRATION	" " •
F " " "	FEELING	" " ↓
I " " "	IDEA	" " ↓
T " " "	THOUGHT	" " ↓
O " " "	OPINION	" " ↓
B " " "	BELIEF	" " ↓
K " " "	KNOWLEDGE	" " ●

Whether mind precedes body in order of existence, or body mind, need not much perplex us, as we must study them together as we find them, to make any progress worth the effort.

We know that the body comes into existence by a serial order of gestational processes, upon a definite plan, and that the mind becomes educated by the inception and repetition of mental exercises.

The bodily machinery wears out and falls into decay, so the mental mechanism becomes incapable of recalling past experiences, which is called forgetting.

A mass of soft iron, while constituting a link in the magnetic circle, is a magnet of power proportionate to its quantity and the strength of the charging current; but the instant the chain is broken the iron is non-magnetic as before.

Did the iron or the current constitute it a magnet? Neither alone, but both in conjunction!

The mass of mind now extant, alas! is analagous to the soft iron, only capable of clear mental perception when in connection with some other mind whose exercise has given it the requisite strength to communicate the current.

Without the power of consciousness, no touch, taste, smell, sound or sight can be interpreted into sense or understanding. So it is plain that reason and unreason, sense and nonsense, are but the matchings and mismatchings of events in the territory of consciousness.

And herein lies the difficulty of propounding the results of observation and investigation in the territories of matter and mind.

Instead of acknowledging that they are interdependent, we have assumed that they were distinct domains that might persist independently.

We might as well affirm that respiration, circulation, and innervation could be separately maintained.

All organization is the result of alternate domination and submission, or compromise of dominion of two tendencies,

namely: centripetality and centrifugality, or togetherness and apartness.

The full dominion of the former in planetary substance results in crystal; of the latter in ether. The full or complete dominion of togetherness in the territory of conciousness results in knowledge; that of apartness in diffuse feeling.

Rapidly passing from one of these states or extremes of tension to the other, without noting the intermediate stages of physical or mental progress, has given rise to the doctrine of cataclysms or floodings, in which all traces of stages of togetherness and apartness were obliterated, and a new order instituted in accordance with the whereabouts of the observers when they gave attention to the status in which they were.

This doctrine, without the shadow of support in nature, has withstood progress to such an extent that teachers to-day dare not depend upon their own convictions to verify the truth of the propositions they essay to investigate, but cringingly ask "what the authorities will think," or "in what book the proof may be found?" As if authority and book were anything but the repetition or the record of the mental labor necessary to the demonstration.

Tidal-waves, upheavals and explosions have been cited as proofs of cataclysm as the order of natural planetary progress; each and every one of which is substantial testimony to the opposite doctrine of regular, serial, order, in the occurrence of planetary processes.

In what, then, does our power to observe, investigate, and to differentiate consist? Manifestly, first, in possessing the power; and second, in exercising it in accordance, not only with the laws upon which it is itself constituted, but also in agreement with the laws and conditions of the subject of observation or investigation.

As the world progresses, ought we not, then, to be better and better prepared to solve, piece by piece, the problem before us? How shall we proceed to conserve helps and banish or surmount hurts to our progress?

In accord with that already stated, our first need is a correct mental philosophy to enable us to acquire the power of knowing when our queries are satisfactorily answered, so that we may rise above the adverse magnetism of those teachers who dwell with emphasis upon a single state or department of the labor of explaining the solution of the problem by varying the statement and in endless repetition, until we are engulfed in the mælstrom of voice without significance; till from very weariness we are forced to acknowledge that to be clear which is not explained, but rendered yet more intensely dark!

The veriest skepticism is preferable to such a state!

Mercury and carbonic acid are examples of bodies capable of passing from the vaporous to the crystaline state or condition by the management of pressure alone, so that crystal, soft-solid, waxy, fluid, liquid and gaseous bodies may be exhibited of these substances running up and down the scale of togetherness and apartness without cataclysm, flood or lines of demarkation of these differentiations, which are thus found to exist but in degrees commensurate to the pressure put on or taken off at the pleasure of the investigator, or the spontaneity of natural production! *Pragmatic pathology* includes all the progresses and regresses in the constructions and destructions of the individual (separate) domains of crystalosophy, cellosophy and corpusculosophy, an exhaustive observation of whose processes will bring within the pale of consciousness all the possibilities of matter and mind.

In a former report it was asserted that the human kingdom was built upon the destructions of the mineral, vegetable and animal kingdoms, by correlating them on a higher and finer order of arrangement in the human as their predestinate ultimatum.

In like manner the pragmatic pathology includes all the former phases of solidal, humoral (or fluidal), neural and cellular presentments of this predestinate (or completed, pronounced), pragmatic pathology; the study of which will

reduce to scientific certitude all that was of authority in the former pathologies, and effectually reconcile the discrepancies that have kept the territories of consciousness and physics perpetually asunder.

That the blissful reign of the pragmatic pathology may soon prevail, it is necessary that it be understood and taught by as many as possible at the beginning of its pronouncement.

I account myself fortunate in the happy opportunity that our young, fresh and nearly untrammeled profession presents for the introduction of the latest, highest and best discoveries of law and process; no less than the triumphant vindication in practice of the new method of securing the reproduction of carious and necrosed bones repeatedly brought before this body in my former reports, and exhibited in detail to many who are present.

DISCUSSIONS ON DENTAL PATHOLOGY AND SURGERY.

REPORTED BY THOMAS O. SUMMERS, A. M.

After the reading of his report, Dr. Atkinson continued as follows, illustrating his subject by well executed diagrams:

That I may be clean, I feel bound to say to you, that not a word in that report is mine, but it is taken from the fount of inspiration which wells up within me. When it is fitting you'll get the rest. Are you able to bear the truth? You know what our Savior said to Zebedee's children, "Are ye able to drink of the cup that I shall drink of, and be baptized with the baptism that I am baptized with?" Like all fools, they answered "We are able." Now I am not so far gone as that. Remember I am speaking to your hearts and consciences, as well as your intellects. I am going to vindicate the great Architect of the Universe.

We have, 1. Dermatozoa. They have simply skin and contents; endowed only with touch. They have feeling only. Their nature is savage. Their idea of divinity is power, *force.* Their marital relation is "touch and go"—indiscriminate. 2. Next we have articulata, which have tongues. To touch they add taste. They associate by two senses. Nature, barbarous; custom, clanish. Reigning religious idea, *fear.* Marital relation, *inconstant.* 3. Vertebrates. This is not brought about by cataclysm, but is a serial development—the rocks are as human as you. This class is the Rhinozoa. Three senses—touch, taste, and smell. Semi-civilized. Political idea, a republic. Religious idea, *Jehovah.* Force and fear are the reigning elements. There our friends, the Jews, stand to-day. Marital relation, polygamy. 4. Ottozoa. These have four senses—touch, taste, smell and hearing. Their political idea is democratic and republican. Religious idea, Paternism—God the Father. Marital relation, monogamy. 5. Ophthalmozoa. They have five senses. They add sight to all the rest. Here music and color comes in. Political idea, republic. Religious idea, Immanuel—God with us. In their marital relations, their affections are ahead of their intellects. Here conjugiality is the leading idea. Marital slavery is swept away by the besom of destruction and love, for the Lord is with you.

That means health of mind, body, soul and spirit. Its *ghost,* La Place, said, "he had dissected many and many a subject that he might find the soul." Why he is not begotten yet, let alone gestated and brought forth. We turn from the light and say it is as dark as hell. Now we have three foundations on which to build. 1. Crystolosophy. They say crystol is dead, that they belong to the Azoic period, which was perfected before the vegetable. 2. Cellosophy. 3. Corpusculosophy. This last has nitrogen in it.

Discussions on this report being called for, Dr. Atkinson said:

We have gone slowly in medicine, simply because we have been dominated by past stages of development and processes of destruction. We have given credit to teachers for knowing more than they really do. Now you have heard me laud the saturated solution of the chloride of zinc, used to stop necrosed action in bone.

Now when I say I have something of a *new love*, you will say I am not consistent with the doctrine I teach—that I am not a *monogamist.*

But I deny this charge.

Now, sulphuric acid is the remedy for necrosis or caries of bone, from the chemically pure down to the compound aromatic sulphuric acid—the elixor vitriol, (SO_3, HO) of the shops. If I had heard that twenty years ago, I would not have believed it. It is based on the law of affinities in that diagram which I have just explained. I once had a case of necrosed spinous process of the second lumbar vertebra, in a female patient. By inspiration, for you know it is the inspiration of the Almighty that giveth us understanding, I touched it with sulphuric acid, and I had such a cure, that the surgeons denied that there had ever been any necrosis at all. I acted on that hint, and am now ready to pronounce it a *cure.* There is an affinity between the salts of lime which make the bone hard, and the sulphuric acid, (when the bone is deprived of its vitality), that it acts on all the lime deprived of animal life, and produces solution. The following expresses the reaction:

Phosphate of lime + sulphuric acid = sul. lime + hyd. phos. ac. $CaO + SO_3\ HO, PO_5 = CaO, SO_3 + PO_5\ H\ O$. Sulphuric acid does not act on cell life. I have had such marvelous results from this treatment, that I announce it from my head clear down to my *pyramidalis abdominalis.*"

If you follow *this*, ugly cutting in the mouth is at an end. What are the forms of diseased bone to be treated in this way? One is when the solution of lime salts leave the mat-

rix of animal matter—*mollities ossium.* Another form of death in bone is necrosis, where a considerable territory is deprived of pabulum. Another, osteal ulceration or caries, where only the outside stratum of cells is thus affected, and there is an attempt at reproducing the solution of lime salts. In this case there is considerable swelling and drawing up like the *columnæ carnæ* of the heart, and you will diagnose it as *osteal cyst.* It is not *exostosis.* Now what do you do? Why puncture it and inject sulphuric acid. Protect the external parts. Make a little pocket so as to form a clot. With a little ingenuity you can accomplish this with a bit of rubber. Now don't go and inject three quarts in a person's mouth. Clean out the cavity, and get it as dry as possible with bibulous paper. Then take a hypodermic syringe and inject the sulphuric acid, drop by drop, and it will be drank up by the necrosed bone like syllabub. Then dress it with two parts tannin and one part glycerin on a little mat of cotton.

This treatment will do for any bone that is necrosed.

You can discover whether the bone is saturated in two or three days, or eight days at most.

To speak of the differentiation between the saturated solution of the chloride of zinc, and sulphuric acid. The latter has not so penetrating and multiplied extent of action. When the chloride of zinc is used, the capillaries collapse, and the blood regurgitates, and this goes on as far as the next switch of the capillaries with the venous and arterial radicals, and forms of the capillaries as far as the affinity is satisfied, the hydro-chlor. zincate of albumen, and where it is only strong enough to act as an astringent the reflow of the blood column will re-open the capillary and admit the fluid blood, and the red and white corpuscles, and the nutrient action is then established after its normal mode. It creates a foreign body. What becomes of this?

Dr. Carroll: "It is expelled."

Dr. Atkinson: "What does nature do with foreign bodies?"

Dr. Peebles: "It first dissolves them, then they pass through the tissues in the form of gas."

Dr. Atkinson: "That's nothing but expulsion. Can any one answer the question?"

Dr. Morgan: "Nature rids herself of foreign bodies in two ways. 1st. By direct expulsion. 2d. By encysting them."

Dr. Atkinson: "That's right. Light has broken in on us all of a sudden. Now it is marvelous the toleration of interference of the superior maxillary bone. If this had not been the case it would have been destroyed long ago, for it has received such treatment at the hands of Dentists, as equals the horrors of Pandemonium itself. We have found out that nature either encysts or expels a foreign body. Now this depends on temperament, temperature, exercise, diet, light, shade and many other things which are a part of your life. Sulphuric acid kills all mineral life as this is a mineral acid, and the bone is renewed after its original pattern. I am sure the time is coming when we shall be able to redeem every diseased molecule, and know the processes of its original formation.

When the necrosed portion of bone has been sufficiently saturated, then wash out the cavity, and apply a little tincture of calendula. If there is an abscess which is not open, you can open it with a dressing needle, wash out the cavity, dry it with bibulous paper, and then put the sulphuric acid in it, and be sure you are not doing it for money, and you'll succeed."

A member: "What strength of sulphuric acid would you prefer?"

Dr. Atkinson: "That most preferable is pure sulphuric acid, when the disease is well defined. When this is not the case, use 1 part water, and 1 part sulphuric acid."

A member: "What is the form of the matter washed out?"

Dr. Atkinson: "Are there any Italians here? It comes out in the form of *vermicelli.*"

Prof. Cutler said, "Now that Dr. Atkinson has come to a practical basis, I am able to appreciate him. When he was soaring on his metaphysical flights, I was not able to reach him. In relation to the chemistry of his treatment, I remark first, that phosphate of lime, is a tribasic salt, three atoms of lime to one of phosphoric acid. Now we want to know how acids act on lime. We are told by a recent writer in one of the journals, that sulphuric, nitric and hydrochloric acids do not decompose lime, but produce a solution. Now the facts are these, that sulphuric acid takes one equivalent of lime, and the remaining salt is no longer a phosphate, but a bibasic, and acid, or a sub-salt, and is soluble, and hence may be washed out. Hydro chloric, and nitric acids do the same thing Sulphuric acid forms the sulphate of lime—the common gypsum or "plaster of Paris," of our laboratories, which is insoluble. The following is the reaction:

* $CaO, PO_5 + SO_3, HO = CaO, SO_3 + PO_5, HO.$

Phosphate of lime + sulph acid = sulph. lime + hyd. phos. ac

Hydro-chloric acid forms a soluble salt more readily washed out, and so with nitric and acetic acid. All form soluble salts but sulphuric acid. When the oxychloride of zinc is used, the following is the reaction:

$(ZnO + HCl) + CaO, PO_5 = CaCl + PO_5, HO + ZnO.$

The zinc is turned loose as the oxide. The same may apply to the carbonate of lime, when the carbonic acid is set free as a gas, and the sulphate, nitrate, or chloride is left according to the acid used, thus:

$CaO, CO_2 + SO_3, HO = CaO, SO_3 + HO + CO_2.$

* The old symbols are used, as the new have not yet been adopted by the dispensatories.

Now, if you put strong sulphuric acid—the anhydrous or Nordhausen sulphuric acid on lime, no action takes place. It must be first diluted

In regard to necrosis, we have been taught that a necrosed bone is a dead bone—a speck for instance of the alveolus killed by arsenic—a sequestrum out of control of the vital powers; it may be in the tibia, fibula, or any other bone, but wherever it is, it means dead bone. Mollities ossium—the softening of the bone similar to rickets in children, is a diseased action, but it is not dead bone. The lime has gone out of it. In relation to sulphuric acid becoming dark with age, we remark that it has such an affinity for water, that it takes it from the cork or other organic matter with which it comes in contact, and leaves the black carbon diffused through the liquid, imparting to it a dark hue. Now, in applying the acid to bone, when you get down to the sound bone, sulphuric acid does not stop with taking up the inorganic, but attacks also the organic matter, from its affinity for water, and it then becomes dead tissue, because living tissue requires carbon and water. If you apply it you will eat down to the living bone, by dissolving first one layer and then another of lime, until by repeated application you eat through the whole bone. The teeth form an exception to this. They are semi-bone and semi-crystal. They are endowed with the most sensitive nerves in the body, not excepting those of the eye, and the tympanum of the ear. They possess both nutrient and sensory functions. This intertubular region where we can not trace nerve fibres is sensitive. But in bone you can saw through to the marrow, and you will find no flinching, I have observed this in my own surgical operations. We sometimes have cases in which the tubuli of the teeth project very far up, even through the enamel, forming a cul-de-sac, and you will find these exceedingly sensitive. Where this is not the case you will not find them very sensitive. In relation to building up osseous structure, for instane, necrosed alveolus—it has been said that can this be done.

I am prepared to take the negative side of this question, and say that it can not be done. If it ever has been done, it is not the rule but the exception, and I have my doubts about that even. The reason is this: The membrane lining the interior of the alveolus is reflected up to the free margin of the gum, and over the top of that margin. Now, when this is destroyed by any means as cobalt, arsenic, or by absorption—a cement—a *crusta petrosa* is formed, which has been regarded as true bone. Now, true bone is very low in vital structure. The tooth is the highest endowed organ of the body—the eye and the ear not excepted. This cementum has the function of bone, but it has more than this. Many call it *super-bone*, because it has sensation which bone has not, and it receives this through the tubuli and canaliculi which is not the case with true bone. Now, when you find a tooth denuded of its periosteum, it is exceedingly sensitive. This is never the case in bone, for as I have said, you may saw through to the marrow before any sensation will be exhibited. You find in this cementum a high state of sensibility—it can not bear the touch of the tooth pick or even heat and cold. Here you have a dry surface highly sensitive; these nerves cropping out impart great sensation. Does true bone do this? No. There is always an exfoliation down to the diploe. Nature must improvise a new membrane and matrix which it will require two years to complete. In relation to building up the alveolus, we can not restore the membrane—nature does not provide for this. There has no such case taken place, except perhaps, in young patients. This is because dentine has no blood vessels, and no provision seems to have been made for this. When you see roots growing together, you will always see them united by cementum, and not by the membrane. It is very much like bone, but it is not bone. You may have a destruction of alveolus, a case of which I had by an incautious application of arsenic. All between the molar teeth was necrosed. I ultimately got an instrument between them, and scraped out perfectly

the necrosed bone. No reproduction ever took place, through the gum was intact. Nature made no attempt at reproduction. In relation to building up the alveolus, you have a triangle, the hypothenuse of which runs up the gum. When you come to the cementum, you find no blood vessels, and hence it can not be rebuilt, for you must have blood to carry pabulum. It is extra-vascular, but not extra-neural, and this is an exception to almost every thing else. It is a nervous projection beyond the vascular. We know upon authority that it takes two years for reproduction, but we lack *post mortem* demonstrations to prove that it takes place here at all. We want actual experiments here. If it does take place at all, it requires two years. In relation to the reproduction of bone—that is the only tissue which is restored in this way. Muscle is not restored by reproduction—bone is perfectly reproduced, especially in young persons. We lack testimony in regard to this action of acids on bone. We want information on this point. Now, it may be found with a matrix which may at some time reproduce. If that is the case, the application will be good up to the point of the root, but not unless you can overcome the inflammation in the lining of the cavity and in the alveolus, which it is difficult to do."

President Judd said: "I simply arise to take exceptions to a few points which I noted in the preceding speech. I do this for the purpose of guarding persons that are speaking on these questions, from making assumptions instead of demonstrations. It was stated that the periosteum could not be reproduced on the root. I want to enquire if there is any demonstration of this. So far as I am acquainted with the facts, there never has been any experiment to demonstrate it. I know of no physical doctrine which would compel me to such a conclusion, and I am cautious of logical deductions. Here I run against Dr. Atkinson who can see a demonstration in what would not answer my purpose at all.

I do not consider that settled where theory exists without practical demonstration. It is in this way that we are led to monstrous errors. No experiment leads to this conclusion. The basis of periosteal structure and cementum is the same. I understand the basis of one to be the same as the basis of the other. The connective tissue is continuous. Where we have a connective structure, we have the elements out of which may be gotten periosteal structure. Bone can be developed from bone in localities separated from the influences of true bone. I hold that there is no improbability in the reproduction of periosteum on the roots of teeth. A case of the sort is reported in the Odontological Society of Great Britain, where the periosteum had been scraped off. Here is actual experiment which points to fact. It does not complete the testimony, but we get this fact, that this connection does take place. When the periosteum is destroyed, Dr. Cutler says, it takes two years for perfect restoration. Operations made within the last few years in the case of cleft palate, have been successfully performed, resulting in the production of bone from these periosteal structures, and demonstrating that bony union does take place."

Dr. Cutler said: "I am as much in favor of the demonstration of facts as any one. It is this for which I am contending, and I say that no Dentist has ever produced this result. I challenge any one on this. I contend that nature does not do it. We have not the facts to prove it. We want demonstration from the tombs. If any have seen this reproduction, I would be glad to see it. It is no proof of it that these men in England published that report. I would not believe it unless I saw it. Pulling out the tooth won't determine it. I do not deal in theory any more than I can help."

Dr. Willis: "I would call attention to a remark of Dr. Atkinson that a foreign substance is disposed of by nature

in two ways—by ulceration and by encysting. Do I understand him to mean that these are the only ways?"

Dr. Atkinson: "No, there are many others."

Dr. Willis: "That is the point I wish to make. Recent experiments have determined that necrosed bone may be removed without expulsion externally. It does not follow that because it is a foreign body, it must come out externally. In order that the foreign body may be absorbed without injury, it must not be poisonous. Now, musket balls have remained without injury in a cyst and so extravasations of blood. A sequestrum of bone must be removed by an operation, by ulceration or by absorption. An instance is given where a sequestrum is removed by carbolic acid. I rose to mention this fact."

Dr. Walker said: "I believe one of the most important subjects which can at present occupy our attention, is a disease caused by the wearing of rubber plates. I commenced using rubber twelve years ago. I did not use it for two years during the war, but afterwards returned to the use of it. I noticed this diseased condition of the mouth in those patients who wore these plates. I ceased using them, and saw no more of the disease. I then resumed them, and again noticed the disease. Finally, having a rubber plate in my own mouth, I noticed the same disease, and on the removal of the plate it disappeared. I noticed others, and found the connection to exist between the use of the rubber and the disease. There was no case in which I did not notice it. There was a thickening of the mucous membrane, afterwards inflamed spots which became worse and worse until they looked like half spoiled beef cut across the grain. Aside from its action on the mucous membrane, it results in the absorption of bone, breaking down the processes."

Dr. Herman: "Have you noticed it from the use of any other material?"

Dr. Walker: "I have not. The worst thing in it is the mercury and sulphur."

Dr. Allen: "It is well known that my preference is for a particular kind, yet I have a case which may throw some light on this subject. I have a letter, which is but one of several, in reference to the wearing of rubber plates. It is from an Elmira lady of refinement and culture. This insidious disease so affected her, the palate sloughed off. She sent a portion of the plate to me to have it analyzed, as she said, 'for the sake of others.' That lady's usefulness is destroyed. She had to abandon her school, her speech was destroyed, and when she wrote her last letter she was still suffering intensely, and physicians and Dentists had almost abandoned the hope of curing her. Continual salivation is kept up. She continued to wear the rubber until it was too late to stop the ravages of the disease. A great many cases have come up in my experience, and my convictions are that it should not be used."

Dr. Morgan: "I have seen but few large artificial plates which did not give trouble in this regard. It is not the natural condition of the mouth to be covered. Nature did not provide for the wearing of an artificial roof. I have not observed the disease resulting from the use of rubber any more than from the use of other plates. I remember a case reported by Dr. Allport resulting from the use of a platinum plate. In this neighborhood there was a case of actual poisoning of the mucous membrane and salivation, from wearing a plate of beautiful coin gold. My recollection of the case of Dr. Allport is, that the patient wore a gold plate without any inconvenience. We know that peculiar idiosyncrasies exist, which must be considered. I will mention another case which came under my observation. The patient, a lady, wore a gold plate 18 or 19 carats fine, and I never saw her mouth otherwise than red and inflamed. I gave directions concerning the wearing of the plate. I boiled it in chemical agents, and then finally removed it and substituted a rubber plate, and the mouth was restored to a healthy condition, and she wore this without further trouble. This proves that it

is only in isolated cases that the disease results from the use of rubber plates. There are few, if any cases, where artificial plates are worn of any sort in which there is not some disease."

Dr. Atkinson: "Does the continuous wearing modify the disease? Did you give any instructions on this point?"

Dr. Morgan: "In the first case there were instructions in reference to taking out and cleaning the plate, but it was afterwards ascertained that it could not be worn at all. In the other case I gave special instructions, and notwithstanding they were fully carried out, a full crop of granules was produced."

Dr. Kulp: "This subject was thoroughly ventilated in the society to which I belong, and I determined to investigate the matter to satisfy myself. Since the discussion in the society I have examined myself five hundred cases, and with the help of some of my friends of the profession there were in all 1,100 cases examined, in three-fourths of which this disease was found. In about one-half that number the condition was changed by the plate being left out of the mouth. I have seen it much worse in the use of silver. I have found it produced by continual wearing of the plate. It is an unnatural condition of the mouth to be thus clogged. We ought to look more at the manner in which the material is worn than at the material itself. I do not think it will matter much what the material is, provided it is properly worn. It should be taken out often and cleaned. This I regard as the great trouble in wearing artificial plates."

Dr. Jones: "I wish to state one condition which has not been noticed in this connection. In most cases mercury is present in the system, and there seems to be such an affinity existing between the mercury and the plate that it is drawn from the system to the mouth, and produces these bad results. Platinum plates produce less irritation and have less affinity for mercury. I have seen worse results from gold, and less from rubber plates, though I am not an advocate for their

use. I think that a very high vulcanization would prevent the reaction produced by the sulphide of mercury in the plates.

I have a case of a physician in St. Louis who has a full twenty carat gold plate which he can not wear at all without inflammation of the mouth and great pain. The plate was taken out and examined and found to be charged with mercury. After heating it to a red heat the mercury was evaporized, and he was able to wear it without trouble."

Dr. Atkinson: "You use the terms, mercury and the sulphuret indiscriminately. Now in what form does it exist in the system?"

Dr. Jones: "I don't know. That is a doubted point."

Dr. Allen: "In reference to the platinum plate reported by Dr. Allport, I recollect that, and it is the first and last case of which I have heard. Let me correct a wrong impression which has prevailed in reference to the manufacture of plates. When struck in the dies it is common for it to be coated with the base metal of the die. When battered they are thus coated, and when annealed the base metal is melted on the surface and remains. When I prepare a platinum plate I take special pains not to let it come in contact with the base metal. I prevent this by keeping a layer of tissue paper between the plate and the metal. In regard to wearing the plates, I remark, it is better to wear them constantly. If the patient takes out the plates the gums have to change. I wear my plate all the time. I only take it out three or four minutes at a time. I cannot do without it."

Dr. Holmes: "The size of the air chamber may have something to do with it, producing undue pressure on the mouth."

Dr. Allen: "I arise to confirm that. This pressure at any point will produce irritation and inflammation."

Dr. Crouse: "The depth of the air chamber has nothing to do with it. There is no more pressure from a deep air

chamber than from a shallow one. It is only perhaps as the tissues press into it further that there can be any inflammation produced. Now rubber does produce this disease, and perhaps metallic plates also. I think, perhaps, the conducting properties of the material used has much to do with it. I have a case in mind in which the mucous membrane was greatly thickened and largely granulated. It had the appearance of a strawberry, it bled, and caused loosening of the teeth. When the plate was taken out the teeth were tightened and the mucous membrane was reduced to half its former thickness. As to the influence of atmospheric pressure, it had no air chamber at all, but was held in place by clasps. The plate was worn three years, and the disease was worse in summer than in winter."

Dr. Walker: "In regard to the different degrees of vulcanization, some of the worst cases I have ever seen have been where the plate was highly vulcanized. Another result of the use of highly vulcanized rubber is the rapid removal of the lime salts from the teeth.

Such a material as this, which brings about such results as these, and which resists all treatment as this does, I say ought to be kicked out of the profession. This disease does not result from a want of cleanliness, for it occurs in those mouths which are kept perfectly clean, and in persons of refinement and culture. When I became satisfied that this disease resulted from the use of rubber, I warned my patients concerning it, and called in by advertisement all the rubber plates I had put in. This brought many cases before me. There was one in particular which I noticed, a young man in good health before wearing the plate. After the insertion of the plate there was inflammation of the soft palate, which extended down the throat. From my explanation he was satisfied that the plate was the cause of the disease. I have under treatment a physician, who sitting at my table one day, complained of a very sore throat. He had a strong cough. I accidentally noticed that he had a

narrow rubber plate below. He seemed much surprised when I told him that the plate was the cause of the disease. It had caused a relaxation of the soft palate. He removed the plate and rapidly improved. One of my patients told me of an inquest which was held over a person who had died and who wore a rubber plate. He said that had he been on that jury he would have pronounced it death from salivation."

Dr. Moffitt: "I have been fourteen years using all kinds of material. Most of the trouble resulting from the wearing of metallic plates which has come under my observation arises from mechanical action. Now rubber produces something more than this. I saw one case of a lady in Harrisburg, who had ulcerations in the mouth, and the mucous membrane inflamed. I examined the case and advocated the removal of the plate, after which there was great improvement. She not being satisfied that the plate was the cause of the trouble, resumed its use, and there was the same result as before. I put in a platinum plate, and there was no further trouble. Platinum has less affinity for mercury. Aluminum has less than that, and I think it is the substance which should be used."

Dr. Forbes: "Did Dr. Walker notice the temperament of his patients?"

Dr. Walker: "The case I first mentioned was nervous-sanguine."

Dr. Forbes: "Were they not all nervous?"

Dr. Walker: "On the contrary, the young man was sanguine-bilious."

Dr. Forbes: "We have not taken electricity into consideration. Platinum is a better conductor than gold; I believe as good as copper. My judgment is that platinum will excite more inflammation than any thing else. At the time I heard of Dr. Allport's case, I had a relative who wore a plate of continuous gum, from which he suffered. When it was taken out and a gold plate 22 carats fine substituted, the inflammation subsided and none supervened. In nervous tempera-

ments, even the putting in of fillings will excite electricity, and the tooth will be decayed around the margin. I deny that rubber is a non-conductor. Does vulcanizing destroy its conducting power? No. As Dr. Jones has referred to the affinity of platinum for mercury, I say that would be a good way to get the mercury out of the system. There is an item for us to act on. It has lately been demonstrated that electricity generated in the mouth in different temperaments is in proportion as the nervous predominates in the system. After one filling has been put in the mouth, the insertion of another has been known to generate an electric current, causing decay around the margin."

A member: "Does the same metal produce an electric current?"

Dr. Forbes: "Where differently refined gold foil is used there is a current produced. A tin or amalgam filling with a gold filling would produce a positive current. I believe that aluminum will be the best metal, it being a poor conductor, poorer than tin.

Dr. Walker: "Temperament may make some difference, but I have found the disease indiscriminately in all temperaments."

Dr. Peebles: "I wish to relate one case which came under my observation—that of a lady for whom I put in an entire set, upper and lower rubber plates. The lady was perfectly healthy. I dismissed and told her to return in two days. She did not come before ten days, and when she did, told me that she had not been out of her room since the first day I put the plates in. She was sick at stomach and emitted a greenish solution, and her physician said she was poisoned. I readjusted the plates, dismissed her and called on her physician. He told me he did not understand it. I told him the plates were vulcanized very hard, and I did not see how they could be the cause of the trouble. We agreed to detain her under treatment for her eyes; she was then visiting a friend for this purpose. I then made her another plate, adjusted it

to her mouth, and in three hours the same symptoms returned. She went home, used no plate at all, and returned in twelve months, when her gums were well. I made her a gold plate, which she wore without injury."

Prof. Judd: "This subject is one of great interest, and I would not feel as though I were doing my duty if I did not speak what I know. Our duty is to look at the truth and keep our pockets out of the question. We profess to combat disease. These individual cases from gold, platinum or mechanical irritation do not lead us to the truth. It is even claimed that peculiar dispositions are affected differently. Now I say we have various diseases in the mouth. But talk about disease! why, here is one resulting from mechanical irritation, another case of poisoning, and I know not what. The thing is to differentiate them, and not class them all under one grand head, *disease.* Now these are the facts: There is no one engaged in extensive practice who will not find cases of this rubber disease. There are a great number of cases which I might mention. It is of daily occurrence. Any one can tell it. There are many cases in which half the arch is filled with a spongy mass. It does not take place suddenly, but after a few months if you will examine the mouth, you will find it soft and spongy. I remember a lady in whose mouth the surface was rough, thrown up in granular masses, just like a strawberry, only purple instead of red. But one out of a thousand escapes. I have seen some of the worst cases of necrosis resulting from it. I have seen the palate, vomer, and nasal bones entirely destroyed by the mercury in the rubber. Prof. Barker says thirty-six per cent. of this rubber is mercury, twenty-four per cent. sulphur, leaving only forty per cent. of pure rubber. Sixty per cent. is not rubber at all, but a villainous compound. It may touch your pockets and your ease to do away with this, but we must learn not to be governed by such motives as these. Who would think of put-

ting a plate of mercury in any body's mouth? Some say the sulphide of mercury is insoluble, and hence harmless. Arsenic is insoluble. Would you put an arsenic plate in the mouth? Others say that it is bound up in the rubber so that it can not be injurious. That reminds me of the tale of the Irishman and his six prisoners. When asked how he captured them, he answered, "By surrounding them." Forty per cent of rubber surrounding sixty per cent. of sulphide of mercury! Wherever there is *red*, there is sulphide of mercury, and this disease is produced by it without a doubt. It can be accounted for in no other way. Now I want to know whether it is proper for us to receive this sulphide of mercury and call it rubber, and put it in the people's mouths. I know there will be a great deal of difficulty in getting rid of this, but we must consider the fourteen thousand men throughout this land engaged in the practice of this profession. A great deal can be effected by them. We should feel no hesitancy in taking a decided stand on this point. We will and ought to be held responsible for the use of this compound. I do not use it and never intend to."

Dr. Atkinson: "I am glad of all this discussion, because there is a thread of truth running through it all; but it is a pity to spend time in this detail and practice. Let us try to discriminate between scientific results and the cradle songs of nurses. Let us cry to be delivered from this thraldom of darkness, and to be brought out into the light of truth. I am not going to stand up for the god Mercury nor the goddess Hygeia. Let them alone, and mercury and hygeia will take care of themselves. I am going to try to polarize your minds, that you may know the truth. In reference to drawing the mercury from the system by the wearing of plates, if I had a case in which the system was charged with it, and believed a plate would attract it, I would say that it was the very thing to draw it out.

I began by studying *divinity*, then *medicine*, then *dentistry*,

and I contend that I was rising all the time. I count all things but trash, except as by the cancellation of the processes through which I have passed. I have arrived at the truth. If you want to shoot a squirrel in hickory-nut time, yon don't go down into the swamps, but along the margin of the ridges where the hickory trees grow. Now if you want to shoot mercury, don't go into the body of the bones, but into the connective tissue that forms the matrix along the margin. Necrosis is formed by something which cuts off the pabulum—that is *syphilis.* I know you don't believe it, but nevertheless it is a verity. Wherever you see necrosis, it is traceable to that old hydra-headed monster—offense against connubial law. If I were going to treat it I would treat it as though I recognized it in the tertiary form. Destroy the first portion of the poison which you see with creosote, binoxide of mercury and potash, or iodide of soda when you meet it in the tertiary form. The process of removing the bone is a matter of choice. It comes as a voice from above that we should extract no more teeth. We laughed at Sir Chas. Bell when he told us to cut them off below the point of decay. I tell you he was pretty nearly right."

Dr. Moore: "Do we understand you to say that all necrosis is the result of syphilis?

Dr. Atkinson: "There is but one cause of disease in bone outside of zimotic influences. It all may be traced through a scrofulous and hence syphilitic diathesis."

Dr. Carroll: "Can it be reproduced?"

Dr. Atkinson: "If the pulp is living. Get a plasm and a pocket and you will have reproduction. *It has been done.* I am sent to marry your intellects and your affections that you may know the truth. Pabulum occupies the Haversian canals and canaliculi. Now the Haversian canals do not continue forever. The process of their action is the expulsion of the pabulum, but they are only destined to live a certain length of time. That is why I said there were only three domains in nature, crystallosophy, cellosophy, and cor-

pusculosophy. Now if we dissolve out all within the range crystallosophy, an exudation process is set up, and there is a projection of cells which fill up the chasm."

Dr. Morgan: "Does age and stiffness result from the closing up of the receptacles of plasma?"

Dr. Atkinson: "The corpusculosophy ought to be maintained. This fact is not recognized by scientists, but we can not have all the field notes when the hour hand of existence points only to ten o'clock. Any process of nutrition requires pabulum, corpuscles, then cells, then tissues, then systems, and then you have the human organization.

Dr. Walker: "How does mercury act on bone?"

Dr. Atkinson: "If at all, by affinity. The sulphide of mercury must be reduced to the globules of the metal. What is there which has this affinity for mercury? I know nothing. In the first place you had no business to take out the teeth. Only a root requires extraction. We first break the law and then 'rush in where angels fear to tread' and try to mend it. Now the mercury can only act by special affinity. It may be taken up as the chloride, which will destroy the alveolar process. You must in this case make your diagnosis as the surgeons do, by *exclusion.* By this you may arrive at the specific individual cause. It could not be mercury, *as mercury.* Is the rubber mercury? No. Will an amalgam salivate? This rubber fixture may be the exciting cause of a pre-existent disease. Some say this is a disease *sui generis.* If it is produced by the rubber, then throw it away. Don't scar your souls, so that when you get up yonder your scarred tissues will prevent them from knowing who you are and what you are. Do all the good you can, and leave the consequences to the forces that govern us."

Dr. Allport: "But you haven't told us whether rubber produces this disease or not."

Dr. Atkinson: "*I don't know.*" (Laughter.)

Dr. Cushing: "There seems to be a marked discrepancy in the observed effects of rubber plates in different sections.

Possibly climatic influences may have something to do with it. In reference to the case mentioned by Dr. Crouse, I will state that I saw it, and it was of a most marked character. I have observed this disease only in the mouths of persons wearing the rubber. In the case cited by Dr. Crouse the mucous membrane beyond the margin of the plate was in as healthy condition as any I ever saw. It was diseased under the plate only, and the whole surface of the mouth covered by the plate was granulated like a strawberry. It was very red and there was also considerable tumefaction."

Dr. Dean: "It was almost scarlet."

Dr. Cushing: "I think she said she had worn it one year."

Dr. Crouse: "I remember distinctly that she said two winters, which at the time I examined it would have been nearly three years."

Prof. Taft: "This is an exceedingly broad subject, and especially so when we descend to minutiæ. It would seem that it would be more profitable to confine ourselves to general principles rather than to the description of cases, which are only of use in order to demonstrate principles. It is very interesting to any one who wishes to maintain the proper functional action of the system. But the manner of treating these diseases is the point which should be considered. I always have sadness when contemplating disease. It is always more pleasant to contemplate the system in a healthy state. We meet with disease continually, which it is our business to combat. I have been interested in this discussion. The disease seems to have embraced both the soft and hard parts of the mouth. Disturbance of the vital functions of bone arises from various causes, whether always from the introduction of inimical agents or not, is doubtful. Dr. Atkinson asserted that all disease was produced by the introduction of inimical agents. A very small amount of some kind of material will produce destruction of the entire body. I was very much interested in his treatment of necrosed bone. It seems to me a rational

treatment to introduce sulphuric acid with a view of producing such solution as may be required. Dr. Cutler, in referring to this, said that nitric, hydrochloric and acetic acids would produce the same result. Now it is a question whether these acids will act as well as sulphuric. They do something more than dissolve the bone salts in the dead bone. Sulphuric acid will simply dissolve these salts, but not, as does nitric, act on living tissue. The phosphate of lime is dissolved out by sulphuric acid, and then the soft parts would be carbonized by the absorption of the water, and this charcoal covering would form a protection to the parts beyond. It is not so with nitric acid, which would destroy the tissue. In reference to the process of opening where an abscess has formed, I suppose the main object is the ready removal of the necrosed parts. After all, the application should be carefully made. In making this opening, as well as the opening of an alveolar abscess, it would be well to use the *tangle-tent*, a fibrous structure which can be trimmed down to a convenient size. If you let this remain in the abscess it will enlarge by the absorption of moisture, and thus force the abscess open. There are a great many things to be taken into account in the consideration of disease—age, peculiar structure of tissue, etc. As there are no two faces alike, so there are two systems alike. I don't believe that vitality is equally strong in any two persons. We all recognize this fact of the difference of susceptibility.

A good diagnostician makes up his mind at once from indications which he can not explain to another. A great lesson which we have to learn is that each must study for himself. We must receive our information from various sources, by the study of nature, and physiological conditions. The aim should be to avoid disease. I think some times that perhaps we love to battle it; but is it not better to meet the enemy before he comes fully armed to attack us? I think it would be better to prevent his coming. I

don't know so well as Dr. Atkinson does that Hygeia will take care of herself."

Dr. Cutler said: "I would ask first what constitutes *pathology*, whether it is not abnormal or diseased action—the perversion of physiology. When a Dentist is called upon to pull out teeth, is not this a conversion of the mouth from a physiological to a pathological condition? Is this all a Dentist can do? If so, then God deliver the human race from this profession of quacks and humbugs. Now if you can restore the mouth to its original condition, you will convert it from a pathological to a physiological condition. But this is not done when you put in your miserable substitutes. If we were all like Dr. Atkinson, we would have but few cases of this sort. He seldom extracts a tooth. Why? Because he has taken out the offending substance. The whole animal kingdom have good teeth, why is it that the human race, with all its science, is devoid of teeth when they arrive at old age.

I think it should be made the religious duty of parents and Sunday school teachers to look to this hygiene of the mouth. It was an ancient religious duty to bathe in order to raise up soldiers for the country. Now teach this in Sunday schools; let every teacher impress upon his pupils the importance of taking care of the mouth and keeping it clean. Let physicians and divines teach this also, and you will have children raised up healthy, instead of imperfectly developed osseous systems. The teeth show this more than any thing else. The bodies will be supported at the expense of the teeth. I think it is the duty of every Dentist to impress this upon Sunday school teachers. In order to have healthy children you must have healthy parents. The present generation is born almost toothless, especially in fashionable circles. Were I to say all that could be said upon the rubber question, it would fill a volume. We would have to go into the whole domain of physiology. We would have to show how like poles repel and unlike attract. And all particles of

matter have a north and south pole. The teeth are not an independent entity. They are only a little elevated above a crystal. Every molecule of the body is held together by positive and negative influence of magnetism, at one time in a dynamic condition, at another in a static. All matter is in constant motion, the animal kingdom more particularly than the vegetable. In the case before us, in order to restore the mouth from the pathological condition induced by the extraction of the teeth to the physiological condition, we produce another pathological condition. A plate can not be worn without pressing upon the mouth and producing a change in its normal condition and destroying its vitality. A plate such as platinum is an excellent conductor of heat, and produces too much cooling, which by lowering the temperature of the mouth produces inflammation similar to that produced by a burn, for the sensation produced by freezing and that produced by burning is the same. So long as the normal circulation goes on there is no disease. Now another plate is made of a substance which does not conduct heat well, and a burn is the result. Now there are some persons of such strong vital temperaments that they can resist this influence. They can eat sand and digest bricks, drink a quart of whiskey at a time, and yet live longer than the generality of men. Now what is disease, nutrition and waste? It is all the result of oxidation. They meet in plasma and gas. Oxygen goes in and seizes on the living tissue and takes out molecule after molecule of hydrogen and throws it through the lungs. The food goes in to compensate for this waste. Oxygen must be converted into ozone before it can act. It then seizes hold on any thing, and in accordance with the law of polarity, nitrogen is turned loose, three atoms of hydrogen uniting with one of nitrogen to form ammonia; two of oxygen with one of carbon, to form carbonic acid gas; one of ozone with one of hydrogen, to form water. Thus they are polarized out, and we have food as a building material to take its place.

We wear our plates until the epithelium is broken up and the capillaries break; there is an oozing out of blood, and granulation is set up and the plate rests on a fungus mass. The remedy for this is apparent—remove the cause. The cause is a tangible one—the plate itself. The coloring matter in the rubber being one part mercury and two parts sulphur, it is very likely that the plate sets up magnetic action, and every time the mouth is closed there is a current passing which is broken whenever the mouth is opened. To carry this out you will have to go into molecular science; but here we have the effect present, produced by these miserable drugs."

Dr. Morgan: "I do not profess to understand chemistry, to give any definite opinion upon the action of these substances, but there are facts connected with the use of sulphuric acid to which I would like to refer. Why is this used in preference to the other acids? We all know that chemical action is very much modified by vital force. Now while acids have the same effect on bone structure, surgeons use sulphuric acid to produce granulation in muscles, as for instance in those large muscles around the femur, when they are nearly destroyed. Dr. Atkinson asserted that all disease was the result of foreign matter in the system. Now disease may result from taking out some of the elements that are already there. Suppose we take out the caloric that is in a man, put him at the north pole and freeze him to death. In that case there is no foreign matter in the system. I don't know how far this thing of magnetism or electricity may affect the conditions of the body, but I hold that a pathological condition may result from a change of relation of the different agents existing in the body. Another intimated that if we had perfect control of people, the race would not be so subject to disease. This is not true. We can not take care of ourselves. We have yet a great deal to learn."

Prof. Taft: "The argument Dr. Morgan made may be true, but his case was not *apropos*. Though no foreign matter may be introduced, yet the *debris* of the system may not

be removed, but remain as a poison. Taking a cold is the arresting the exudation from the skin, producing a damming back, which results in disease, and this is done by poisoning. In Dr. Cutler's description of the introduction of pabulum into the capillaries, then organized into the tissues, thence changed to *debris*, he did not tell us why this was so. It is simply because force must be elaborated, which is accomplished by this change of relation in the body. Just as we get force from steam, so the manner of its evolution in the body is by this change of relation in the system. Change is necessary. No motion would exist without it. We would be as immovable as the rocks upon which we stand. We are all under the domain of vital force. It is from this elaboration of vital force that the operations of the body go on. When great action is necessary to be put forth, there is greater vital action and greater waste or change of material. Anything that will interfere with this will produce a pathological condition of the body. The action of the mind will affect the body, for the soul rules over the physical organization."

Dr. Morgan: "Prof. Taft has carried out my idea. The great enemy is found in the chemical change which takes place in the body."

Dr. Willis: "The great central force is the sun. All force is directly traceable to the sun. I look on man as a machine, a physical organization in no respect differing from the animal kingdom. Now the body ranges at a certain degree of heat, which if interfered with will result in death. How is heat kept up? Just as in the steam engine. There is not a particle of force that has not been derived from the sun. Heat is produced by burning coal, every cubic foot of which is vegetable matter which was first produced, then melted by the sun. Production is consumption of caloric, which used to be considered a substance; but to-day we know it is no such thing, but only a condition; that is, *heat*."

REPORT OF THE COMMITTEE ON DENTAL CHEMISTRY.

BY JOHN ALLEN.

As organic chemistry treats of the substances which form the structure of organized bodies and their products, whether animal or vegetable, let us look at Dental chemistry a moment from two stand points, viz: the constituents of which the teeth are formed, and the source from which those constituents are derived.

According to Johnson's chemical analysis the constituents which enter into and compose the osseous structure of the human teeth are as follows:

Phosphate of lime, with traces of flouride of calcium, 66.72; carbonate of lime, 3.36; soluble salts, 0.83; cartilage, 27.61; fat, 0.40; phoshate of lime, 1.08.

The enamel, or vitreous substance which covers the crown of a human tooth is composed of phosphate of lime and traces of calcium, 87.82; carbonate of lime, 4.37; phosphate of magnesia, 1.34; soluble salts, 0.88: organic substances, 3.59; fat, 0.20.

These constituents form the basis of the bones and teeth. In order, therefore, to produce a good osseous structure of the human frame, such articles of food should be used as contain a due proportion of these constituents, for such are the operations of nature in the animal economy that when food is taken into the system, it is duly apportioned and converted into muscle, bone, fat, etc. For this purpose the necessary materials of which our systems are formed exist in the proper nourishment designed for man. But by the present mode of preparing certain articles of food (some of which we will notice) a large portion of the essential elements for osseous formations are taken out and discarded. For example, the wheat, rye, etc., of which bread is formed, is stripped of the hull and coarser portions of the grain which are requisite materials for bones and teeth, as deduced

from the following well authenticated chemical analysis, by which it is found that in 500 lbs. of whole grain there is:

Muscle material, 78 lbs.; of the fat principle, 12 lbs.; of the inorganic elements for bone, etc., 85 lbs. 500 lbs. of fine flour contains: muscle material, 65 lbs.; fat principle, 10 lbs.; bone material, 30 lbs. 500 lbs of bran contains, muscle material, none; fat principle, 30 lbs; bone material, 125 lbs.

The foregoing facts should teach the importance of using such food as contains the requisite elements for developing and sustaining a perfect organism in all its parts.

By close and careful scientific researches we have sufficient light upon this subject to serve as a guide which we should follow, for nature is so independent in the administration of her laws, that those who disregard or depart from them must abide the result. Food for children ought to be plain and substantial; such as bread, milk, eggs, meat, potatoes, rice, beans, etc. These constitute the principle articles of food necessary for a good development of the human system.

Adults require the same constituents to sustain the organization of the body that the young do to produce it; otherwise deterioration and decay ensue. More meat may be used as persons grow older.

Condiments possess none of the necessary elements for producing or sustaining a healthy organism.

Candies, which contain poisonous substances (as many of them do), are detrimental. Many of the confectioners, in coloring their candies, etc., employ the following materials: For their greens they use Brunswick green, carbonate of copper, or arsenite of copper. For their yellows, chromate of lead, or gamboge. For their reds, red lead, vermilion, or cinnabar; and for their whites, white lead. All of which are poisonous. Although some confectioners use coloring ingredients comparatively harmless, such as saffron, French berries, Persian berries, fustic wood, etc., for yellows. For

reds, cochineal, including carmine, Brazil wood, and madder. For blues, litmus and indigo. For greens, mixtures of any of the above vegetable yellow with indigo. If the eye *must* be gratified as well as the taste, in these matters, the latter colorings are far preferable to the former, but the purchaser of the candies can seldom tell the one from the other, therefore it is better to use them sparingly.

There are many articles of luxury used that are deleterious to the general health when indulged in too freely, that do not act directly upon the teeth, but indirectly prove injurious by producing vitiated secretions which affect them. Pure saccharine substances, when used moderately, are not considered injurious to the teeth, but when used in excess they become detrimental. When these are taken into the system they are converted into lactic acid. If this becomes predominant in the salivary secretions it attacks the limy portions of the teeth, and thus produces decay.

Now, as a profession we should do all in our power to diffuse practical information with reference to the best means of forming and preserving the natural teeth, for however perfectly we may be able to construct artificial dentures, man can not do the work of his Creator as well as He can do it Himself.

DISCUSSIONS ON DENTAL CHEMISTRY.

Dr. J. Allen: It has been said that if teeth were well formed they would remain so. This is not true. It is just as important to preserve them as that they should be well formed at first. Let us look at the plain facts. When we look at the fact that the teeth of those nations who do not discard the mineral element in food have almost universally good teeth, you have abundant proof of the importance of this. Why is it not so with us? Because we have undertaken to improve on the great Creator. He has given us food in the exact proportions neces-

sary for the proper development of the body, and we go to work and change these by discarding the mineral element. Out of every barrel of flour forty pounds of mineral matter has been taken. Now it has been estimated that every child consumes one half of a barrel of flour in a year, and hence it is deprived of twenty pounds annually of mineral matter, from which its bony structure can alone be built up. When it has reached twenty years of age it has been deprived of four hundred pounds of this portion of the grain—this important element—and consequently has not half a dozen sound teeth. The great Creator knew what was best, and yet we change the proportions which He has established in grain as being best calculated to develop the physical organization. It is all our fault. We have thirteen thousand mills and twenty-eight thousand men engaged in this wicked work, and then we have some ten or twenty thousand dentists to patch up the ruins with their nefarious work. The result is, over twenty millions of teeth are annually swept from the American continent. I think it highly important that we should look to this matter. We might do a great deal towards remedying this evil. The community look at us as though they believed us, and will be influenced by us. Now every old woman knows that lime is necessary for the formation of the egg-shell. Why do we not act on this principle?

Dr. Cutler: Dr. Allen has covered every point but this: that is, that children require more of the mineral element in their food than adults in proportion to weight. My microscopic researches have convinced me that it is the closing up of the bone cells that causes the infirmities of old age. The bones become dead, and consequently the system heavy and cold, because the mineral encroaches on the organic or vital element in bone. The flesh gets old by losing its water. It becomes tougher, dryer, and yellow, because of its loss of water. Now is it possible to extend life? May not science advance some light on this point? It may not be impossible to produce boys and girls of one hundred years of age. But Dr.

Allen has not pointed out any difference between the relative quantity of mineral matter required in the food of children and adults. If you make no difference you will have undue osseous development in the adult. You must so regulate the diet as to keep up the *organic* element. If you can take a tuber and elevate it to a cabbage, it seems as though science might do much toward keeping up the organism of the human body. I have no doubt but that life has been shortened by suicide—by a violation or rather transgression of those laws which govern the development of the system. Now I propose to feed old people by withdrawing the mineral elements and giving them fine flour. If the body is healthy the teeth will not decay. This is greatly owing to imperfect development which must follow from the withholding of four hundred pounds of mineral element from a child between birth and maturity. In relation to the amount of lime required; I propose to use vegetable acids to decompose the surplus lime, so that the bones will not have too much, and you know you do not find the other tissues, as the heart, ossified until the cells in the bones are closed up. Who knows but that human life, with proper care, may be prolonged a thousand years, and that we may have *Methuselahs* all around us.

Dr. Peebles: We all seem to have one idea, namely, to feed the children on bran. But how shall we go about it? We shall have to change the whole dietetic system in the domestic economy of our families, unless we can persuade the children into it; but even then can we persuade the mothers that Graham bread is the best?

Dr. Allen: It is a noted fact that in Europe, among the peasants, where they do not change the proportion of the elements in food, they have far better teeth than among the wealthier classes. We find their teeth decaying when they come over here and live as Americans do. There they kept up the supply of the needed elements. The hard tissues do

pass off, and the proper material must take their place. I take the position that you have to keep up the hard tissue. How shall we effect it? Popularize the idea. It depends on popular feeling. There are ten thousand men in our profession—surely we *can* popularize this doctrine.

Dr. Willis: Do you live on bran?

Dr. Allen: No.

Dr. Dickerman: When Greek meets Greek, then comes the tug of war. Dr. Allen brings up as evidence of the truth of his theory the fact that the working classes of Europe have good teeth until they come over to this country and live as Americans do. Now might not climate have something to do with this? Another point—Graham flour costs more than the other, because, say the millers, they can't cheat as well with it. But the point I rose to make was, that climate might have something to do with this.

Dr. Allen: I refer you to Humboldt, who says that in examining the teeth of the Indians—of the aborigines of this country—he found them perfectly sound. Climate has nothing to do with it. It depends on the material of food.

Dr. Allport: I have heard a great deal lately about the effect of food upon the teeth. I have heard it said that the teeth of the peasants of other countries were better than those of our own people. I wish to say that I did not believe it, and during the past year, while in Europe, I took occasion to examine those of the cab drivers and others with whom I came in contact, and in Switzerland, especially those of the peasantry, about which so much has been said in reference to their superiority, and I was not very much disappointed. I found just as many defective teeth among them as among our own people. In England I believe they are worse. I think the real difference is in this: that you only hear teeth talked about among those who have dentistry done. You don't hear any mention made of

bad teeth among those whose custom it is to let their teeth take care of themselves. The idea of the superiority of their teeth is not true so far as I have been able to ascertain. Take a family who never go to a Dentist, and you will scarcely hear a reference made to the teeth. It is in proportion to the intelligence of a people that these things are noticed. There is not the real difference we have been led to believe there is.

Dr. Allen: I don't believe Dr. Allport was much among the peasantry while in Europe. In my practice in the South before the war, I found a difference between the negroes and the whites. While the field hands, as a general thing, had good teeth, those of the domestics and whites were poor. I accounted for it on the ground of their difference in living. I found this difference especially in Mississippi and Louisiana.

Dr. Morgan: I have practiced a great deal among negroes, and I assure you it is the rarest thing in the world to find a negro with a sound set of teeth at 30 years of age. I have seen but one person of mixed blood who had a full set of good teeth at that age. They have almost universally a scrofulous diathesis.

Dr. Carroll: When I read the article to which Dr. Allen referred, I was much pleased with it, and referred my patients to it. I think it is somewhat of a hobby with the Doctor, as it was once with myself. Food, however, does not consist in flour altogether. Air, exercise and climate contribute as much to good teeth as diet. Why is it that in the same families the female members nearly all have worse teeth than the male members? It is because the ladies are nearly all the time in the house, and the men are out in the open air. Dr. Allen recommends the use of Graham bread to preserve the teeth, when to-day he told us of what a fine set of artificial ones he wore; he did not tell us of his natural organs which he had preserved in this way. We have ignored the *lungs*

too much. We need more air. Nor can blood be produced without food.

Dr. Chisholm: Some years since I had occasion to go to San Antonio, where there were a great many Mexicans. I afterwards went into Mexico, where I did some work for the natives, and I was astonished to find what beautiful teeth they had. They lived upon coarse diet, and in very plain style. At one of the hotels at which I stopped there was neither knife, fork nor spoon. When I returned to San Antonio I had occasion to examine their teeth and found them universally good. Dr. Harris' doctrine is that it all depends on the development in early life, rendering them in after life more or less capable of resisting chemical agencies, and also that those teeth which are kept the cleanest are always the best. But varying circumstances bear upon the teeth, though it is to a large extent the aliment which determines their quality.

Dr. Stellwagen: After reading the article to which Dr. Allen referred, and having been unfortunate myself, I determined to commence prophylactic treatment early with my own family. In the case of my eldest child, it was nineteen months before the second deciduous molars were erupted; after which they were decayed. Though it took two months to convince my better half of the necessity of it, I filled the teeth, one with gold, and the other, being much decayed, with amalgam. I concluded to change its diet. I insisted on lime water in the pure milk, such as we get in the city, and that diluted with water, for cow's milk undiluted is too rich; it produces indigestion. I insisted on fresh air. It is said by a high authority that more children die for want of air than any thing else. I had the rooms so arranged that the sun would shine into them. I even had the child placed in it. I believed that life force could be imbibed from this mode of treatment. I had prepared chalk, pressed in between the teeth, and the mouth washed with lime water. It really seemed that a change took place immediately. The child never but once complained. I excavated the tooth which I

had filled to satisfy myself as to its condition, and I am happy to say it was not decayed.

My second child with whom I adopted this method of treatment has a perfect set of teeth. She was not so old as the first one when I began the treatment. I have not confined this to my own family only, but I have also carried it out among my patients generally. When there is an acid condition, I endeavor to combat it with alkalies and chalk. I could not say from my experience that this will be a rule, but I do say that it has succeeded except in the cases of those whom I know did not carry out the treatment as directed.

Dr. Kulp: This has perhaps been a hobby of mine for the last ten years. My theory is that a mother can give almost any kind of a set of teeth to her children that she chooses. I have always taught this in my community, and I have a case in point. There was a lady who was the mother of five or six children whose teeth were all bad. She said she would put herself under my treatment and follow my directions in regard to diet. Seven years ago I took charge of the case, and since that time there were three children born, and these have perfect sets of teeth. I have harped upon this so much that I think in my community they sell more unbolted flour than any other, and I believe we can show more good teeth than any other town of its size. These effects are what we want. During pregnancy mothers have trouble with sensitive teeth. This is due to the fact that nature nourishes the fœtus at the expense of the mother. This is under the control of the dentist. I don't believe lime-water will produce the change required. Let us give the grain in its natural proportions. I believe that if I could with one stroke destroy all the bolting machines in the country, I would do one of the best acts for the benefit of the world.

Dr. Stellwagen: I spoke of lime only as a chemical force.

Dr. Crouse: What was the condition of the mother as to her general health in the case of your second child?

Dr. Stellwagen: Physiologically I am sorry to say worse than with the first.

Dr. Crouse: I don't believe unbolted flour is good. You get food in a more digestible form by using the white flour. I think there can be very little difference if they are both equally digestible. Dr. Stellwagen speaks of pure milk, such as we get in the city. We don't get it, sir! I repeat, show me good digestion and I will show you good teeth.

Dr. Walker: The experience of some has been very valuable. It has been said that there are more bad teeth in this climate. Now it is not owing to the climate, but may in a great measure be ascribed to *scrofulous diathesis. Scrofula*—a sow—pork, that's the main cause of your bad teeth. Another is *hot drinks.* In reference to pork eating, those people in San Antonio who have been referred to, live on jerked beef. You find better teeth in those regions, where pork eating prevails less.

Dr. Stellwagen: Do the Jews have better teeth than the Christians?

Dr. Peebles: I have practiced a great deal among the Israelites, and I find their teeth as a general thing worse than those of Christians. In regard to the Indians, I practiced fourteen years in Missouri, and visited the different missions, and came in contact with the different tribes, and found their teeth for the most part bad, especially the half-breeds. Indian adults have no better teeth than the whites. I examined a good many skulls, made extensive excavations and research, and I found but few sound sets of teeth. This might be due to the fact that the whites feed the Indians on white flour. In my practice among negroes, I find the anterior portion of the arch better than in the whites, but the molars more diseased. In reference to the relative quality of teeth in Europe and America, I would remark that since the discussion on this point at the last annual meeting, Dr.

Forbes, as well as Dr. Allport, has made a European tour, and we would be glad to hear if his views correspond with Dr. Allport's on this subject.

Dr. Forbes: It has for many years been asserted that the teeth of Americans are far inferior to those of Europeans. Not only that they have more decayed teeth, but that the texture of the teeth is inferior. I deny it. When I came to the western country I was anxious to learn the condition of the teeth of the natives. I examined the teeth of trappers who lived in the open air, and the result of my observations was in accordance with the statement of Mrs. Caboney, who has moved much among them and written on this subject. She asserted that in certain tribes of Indians she found good teeth; in others bad. She couldn't give any particular cause for this. In reference to European teeth, I found that those of Americans were far superior, both in texture and durability. A German lady of refinement once said to me, Why is it that as soon as I came over to America my teeth began to decay? Said I, Madame, your teeth have been decaying four or five years. As she was soon going to return home, I told her to observe the teeth of her relatives and see if they were not decayed. When she returned to this country some time after she told me she had done so, and was perfectly astonished to find the condition they were in. In this country it is more fashionable to have good teeth. I was in company with a lady in Europe who had marked the superiority of American dentistry over European. I told her that the majority of the work was good. People in this country were more particular in employing competent dentists. Even servant girls oftentimes employ the best dentists. She seemed perfectly astonished. I asked her If you wanted a nurse for your children, would you get one with badly decayed teeth and a foul breath, to mingle with them? She said that she had never thought of it before. I had heard a great deal of the superior conformation of the

people in Europe, especially, the women. From pure habit my eyes involuntarily fix upon the mouth whenever I meet any one, and I was struck with the superiority of American women in this regard as well as in other respects. In Europe a lady is disgraced if her acquaintances know that she has a tooth filled. I told them I thought it far more beautiful, *more civilized*, to wear jewels in their teeth than in their ears. But it is not necessary to go abroad to be struck with the superiority of American teeth. Every dentist will ascertain from practice among German emigrants that the people of this country are far superior in this respect. The teeth of the Irish are superior to ours, but by the time they reach forty years of age they all drop out from periostitis. Have you not observed this?

While I feel like speaking I want to reply to a remark that has been made on this floor to the effect that it is *criminal* to extract a tooth. When that sentence was uttered we were silent, which means we assented to it. Now suppose I am a practicing physician, and that I come before you and say that I have been in constant practice for thirty years, and during that time have treated every class of disease, and have never failed of success in a single case. You would say that I did not tell the truth. So it is when it is asserted by a dentist that he has never lost a tooth! In all professions men run away with impressions. For instance a man comes to Dr. Atkinson and says, 'I want this tooth out;' but Dr. Atkinson refuses to extract it and obtains the man's consent to have it filled. After this the tooth aches, and the man satisfied that it ought to come out, goes to another dentist and has it drawn; he meets Dr. Atkinson on the street, who asks him, 'How's that tooth?' The man replies, 'Very well,' and Dr. Atkinson is none the wiser. I say it is pure humanity in some cases to extract a tooth, and not malpractice. When I hear this it excites me, *because I know it is not true.*

Dr. Cobb: Dr. Allen's paper was calculated to instruct us, and I like it very much. But it was asked him if he ate that kind of bread and he answered, 'No.' Now we don't live as we ought to live. There have been a number of gentlemen who have advocated this diet, and I venture to say they would answer as Dr. Allen did. One gentleman has said that he practiced it. Now I think if we would go home and practice what we preach, it would be better for us. This eating is a scientific business—or should be. We propose to improve the hard structure of man, and let the physician attend to the rest. Now I contend that we can do much towards developing all the structures. In regard to Dr. Forbes' remarks, I would say I did not understand Dr. Atkinson to say that we should never extract a tooth, but that we should not extract as many as we do now.

Dr. Allen: I would remark that in my earlier days I did not use brown flour, but now our table is always furnished with brown bread. I lost my teeth from sickness and ignorance. They were destroyed by calomel while lying sick at Natchez. I have induced many families to use this kind of bread, and I have not more than one-fourth as much to do among them.

Dr. Kulp: I practice what I preach. My wife weighs some 140 pounds, and I am pretty well developed myself.

Dr. Carroll: I am like Prof. Parker. I am afraid of *fat.*

Dr. Walker: I believe Dr. Cutler *did* mean what he said when he asserted that the time would come when we would extract only roots.

Dr. Dennis: When I hear such a discussion as this, I am reminded of an epitaph of which I presume you have all heard: 'I was well, took medicine to be better, and here I lie." As to consistency, 'Consistency, thou art a jewel. When we adjourn we will go down to the Maxwell House and order tea, milk, sugar, potatoes, mutton, beefsteak, tomatoes,

etc., and when we get through we will have ten or a dozen empty small plates about our large one. We look into our stomachs and feel like the cleptomaniac who has been taken in the act of stealing and is about to be sentenced. He thinks, 'I will never steal again.' But as soon as an opportunity offers he gives way again to the irresistible inclination. The medical profession cry out against the use of stimulants, yet they use more liquor than any other class of men.

Dr. Forbes: I believe the time will come when teeth will decay much less, and consequently we shall have less to extract; but I spoke of the present and not of the future.

Prof. Taft: Dental chemistry is *vital* chemistry. It is that subject in which is couched the influence of vital over physical laws in building up tissues. Vital chemistry, physiology and pathology are so related that it is easy to slide from the one into the other. In reference to the taking up and manipulating food by the system, we remark the system is a laboratory in which the food is prepared and appropriated to the use for which it was intended. When Dr. Cutler was speaking awhile ago, the principles he advanced I am not sure will hold good. His principle goes on the supposition that the system can be crowded with too much mineral matter. I doubt this. I don't believe either that you can force phosphate of lime on the system. It is demanded by the bones, but it is required for the soft parts as certainly as for bony tissue, and yet I don't believe the system will take up more than is needed. I know there is sometimes an unnatural deposit of this material, an example of which we have in exostosis, where the bones may be solidified more than is necessary. If this course of dietetic treatment is correct, it should be resorted to in the treatment of calcarious deposits and other diseases resulting from an excess of calcarious matter in the system. I say if this principle is correct you should cut off the mineral element from the diet. It seems to me to be problematical whether life can be thus prolonged.

Dr. Bogue: There is one point which I would like to

have taken up; that is, the discoloration of dental tissue. Though the enamel does not come under the head of vital chemistry, yet it is affected by the chemical agents in the system. Hematine, iron, or both, may discolor the enamel by the extravasation of blood, or rather the oozing of the contents of the capillaries. Alkalies in certain conditions and acids in others will produce this discoloration. This is practically too little cared for.

Dr. Forbes: When I spoke of the Germans I did not think it necessary to state that they ate rye bread almost exclusively, and scarcely any meat. The Irish, you know, live on potatoes. If Ireland were inhabited by Americans, I am sure it would be the healthiest country in the world. It is the most God-like and yet the most God-forsaken country in the world. The Irish eat very little meat. There is more meat consumed in the city of St. Louis than in the whole of Ireland. In Kent the men grow to the hight of six feet two inches. They have more bone to be nourished, and they live almost exclusively on corn bread.

REPORT ON OPERATIVE DENTISTRY.

BY GEO. H. CUSHING.

A report upon operative Dentistry should naturally present all that has been done in this department since the last full report was made, whether in the matter of improvements or changes, both as to methods of practice and materials used and instruments and appliances introduced, tending either to simplify operations or to render them more nearly perfect.

The endeavor will be made in this report to do this as briefly as possible, consistent with the importance of the points to be considered. But it must not be inferred that the report lays claim to perfection, either in regard to the

introduction of every modification in practice or to the manner of treatment of the subjects considered.

While it is possible that it may treat of some things which are unimportant, it is very probable that some things will not appear that should have a place in it, from the want of information or forgetfulness of the committee.

The subject of operative Dentistry is one of such importance that reports upon it might naturally be expected to be found occupying a prominent place in the transactions of this association, but a search of the records would certainly not convey to the investigator the idea that it was of grave importance, as only two reports upon it are to be found since the organization of the association, and neither of these could in any sense be said to fully cover the ground which such a report should cover.

It has been deemed proper to make this report, if possible, a compendium of the main features which have marked the progress of operative Dentistry since the formation of this association, and for the reason, that while much that has been done and many of the improvements made during that time have been fully discussed and written about in our various societies and journals, yet there is no report as such among the transactions of the association covering all the ground. The propriety of having such a record among our transactions must plead the excuse, if such is needed, for referring to points generally understood, or which have been previously written upon.

It would seem proper, for the purpose of securing the greater completeness of this report, to speak first of the use of cohesive foil for the purposes of operative Dentistry, because of its being the first subject in the order of time, and because since the time of its introduction it may be claimed that the most marked advances in operative Dentistry (as applied to the preservation and filling of teeth) have been made which the profession has ever known.

Since the introduction of cohesive foil to the attention of the profession by Dr. Arthur, some fifteen years since, it has steadily been growing in favor with practitioners generally; and it may now be said that the method of filling teeth with cohesive foil has been very generally adopted.

That this method is more in accordance with philosophical principles than any other, would seem to be a fact easily to be established. In the use of soft foil exclusively, the principle of wedging must be depended upon entirely for the security of the filling, and in order to make a dense and thorough operation, great wedging force must necessarily be used. Great judgment is requisite to determine the amount of such force a tooth will safely bear, while in some cases the frailty of the walls is so great that any amount of such force necessary to properly secure a filling would seem likely to prove fatal to the integrity of the tooth. The least amount of such force requisite to properly pack, secure and thoroughly condense a filling that can be applied to a tooth must be acknowledged to tend to some extent to its disintegration and to fracture; and inasmuch as more force is generally used than is absolutely necessary, the certainty of weakening the tooth and the danger of accident from fracture render the objections to the wedging process quite serious. All practitioners probably have seen numerous instances in support of this position where teeth had been fractured and injured by this wedging force.

In the process of filling teeth with cohesive foil, the principle involved is entirely different. The filling should depend mainly upon secure anchorages, made by means of retaining pits, formed at the base of the cavity and elsewhere where the dentine is firm and strong. From this base or anchorage the structure of the filling proceeds with almost the entire force necessary to the condensing of the gold, directed in the line of the longitudinal axis of the tooth and root, the lateral force necessary to be used as compared with the wedging

force when that method is followed, being very slight indeed. This method must clearly occasion less disturbance of the structure of the tooth, less liability to accident from fracture during the operation, and less weakening of the tooth from lateral pressure upon the walls, while the filling may be more thoroughly secured and more densely compacted than by the wedging process. It would seem clearly true that this is the more scientific of the two methods, where either might be used. But there are cases in which the wedging process could not be used, as where it is impossible to so shape a cavity that it shall present two or more opposing walls nearly or quite parallel to each other, or where the walls are so thin as to render sufficient wedging force impossible or highly dangerous, or in building out beyond the margin of the cavity. In such cases the use of cohesive foil enables the fulfillment of the requirements of the case as nothing else could do. It renders possible the performance of operations which otherwise could never have been performed, and secures the preservation of a large class of teeth, which otherwise would of necessity fall prematurely a prey to the forceps.

The introduction of cohesive foil, then, must be regarded as a decided improvement, and the influence which this innovation has exercised in developing all the improvements in practice which have marked the period since it occurred can hardly be realized. It is not intended by these remarks to ignore the various forms of sponge or crystal gold. They will be referred to in their proper place. But the report proceeds upon the basis that cohesive foil better fulfils all the conditions demanded generally of a material for filling teeth than any other preparation of gold.

A marked advance is clearly perceptible in the last few years in the matter of thoroughness in the preparation of cavities.

The more careful preparation of the margins of cavities and the more complete removal of affected and imperfect tooth substance, whether absolutely broken down

or not, has evidently received far more attention than formerly. The necessity for cutting out fissures and making complicate cavities where there are several simple ones in the same tooth, with but slight sound structure intervening, is growing daily more evident to the profession, and the advanced benefits arising from this advanced mode of practice are becoming more and more established in the minds of all careful observers.

The great principles of physiology and pathology, an intelligent application of which is so essential to successful operations in the mouth as well as elsewhere, are generally better understood, and influence the intelligent practitioner of to-day in all his operations to a greater and more satisfactory extent than ever before, adding to his success in just the ratio in which his familiar acquaintance with these principles approaches thorough understanding of the ultimate truth.

These causes above noted combined have tended to give an impetus to conservative Dentistry in the broadest sense of that term, which is truly gratifying and gives the highest promise for the future.

Under this impetus renewed efforts have been made to develop a safe and satisfactory practice for the preservation of the life of the pulp in cases where it has become nearly or quite exposed. In this report it is only proper to speak of two methods looking toward this end which have received attention of late years, viz: the method known as "amputation of the pulp," and that of "capping with oxy. chl. zinc." The first named of these methods claimed the renewed attention of the profession some four or five years ago, by the improved operation as devised by Dr. W. W. Allport, of Chicago. This improved operation consisted in excising a portion of the pulp and in trimming and smoothing the edges of the orifice of exposure, and thoroughly removing the debris, so that no irritation could arise from roughened edges, or from spiculæ of bone impinging upon

the delicate structure of the pulp. The careful capping of this after the operation with bibulous paper, and filling over that with Hill's Stopping, left the parts to heal and to throw out a deposit of secondary dentine for their own protection.

This operation is doubtless in harmony with physiological and pathological laws, and under the hands of its originator was unquestionably successful to a certain extent, but the very great delicacy of manipulation necessary to secure good results, and the limited number of cases of exposure in which it could be at all applied would seem to render it of no practical value to the profession generally.

The method of capping with oxy chl. zinc appears to have been in use with Dr. Keep of Boston as long ago as 1855, and so far as is known he was the first to use the oxy. ch. for this purpose, though others may have also experimented with it as early as that who are not known to the committee.

Dr. Keep called the attention of the profession to this method in a paper sent to the Dental convention which met at Saratoga or Niagara in 1858 or 1859, entitled "A New and Successful Method of Filling Teeth with Gold over Exposed Nerves. By N. C. Keep & Son."

For some reason but little attention seems to have been paid to this method by the profession generally until some time after the meeting of this association in Boston in 1866, when Dr. Atkinson, of New York, called attention to it through the Dental journals, claiming remarkable success for it. The method generally in use probably is in the main that suggested by Dr. Atkinson, viz: of thoroughly removing all diseased Dentine from over the pulp, even to causing the pulp to bleed, applying creosote, chloroform, aconite or morphine to subdue pain; after drying thoroughly the cavity, applying a small drop of creosote immediately to the exposed point, and then flowing the oxy. chl. over that; after the thorough settling or hardening of the oxy. chl., the cavity either to be permanently filled with gold or tempora-

rily with Hill's Stopping. This method of treatment with oxy. chl. zinc has probably been more generally tried than any other ever before introduced, and with a degree of seeming success that warrants the hope that with such modifications of practice as may come in the future as the result of study and experiment in this direction, it will be found that the great desideratum has been attained of a practice whereby the vitality of the pulp of the tooth may be preserved after absolute exposure even of long standing. Yet until the nature of the action of this remedy is better understood, and until a longer time shall have furnished its evidence regarding this practice, success can not be absolutely affirmed.

There are some of our best men who claim for it complete success with scarcely any exceptions. Others again, equally reliable and careful as practitioners, assert that the death of the pulp ensues sooner or later in almost all cases. But the weight of the testimony seems to be in favor of its success. While this is so, it would be clearly unwise to reject the practice because of some unfavorable results, until a longer time shall have elapsed as the test of those earlier operations which up to the present moment certainly have proved successful. The mind of the profession should rather be bent upon the study of the subject in order that the remedy and its action may become thoroughly understood, so that those modifications of practice may be determined which shall give greater certainty to the practice in the future.

It will not be attempted in this report to explain the action of this remedy, but only briefly to refer to certain observed facts concerning the practice, and to make some general suggestions concerning the details of the operation and the cases in which most hope of success may be indulged.

That a deposit of secondary dentine or calcific material does take place in some cases after treatment by this method there is ample proof, numerous instances being vouched for by some of the most reliable men in the profession, but how

generally this takes place of course can not be known, as comparatively very few cases are examined with reference to ascertaining this point. It has also been demonstrated that many teeth having been thus treated have evinced satisfactory evidence of the vitality of the pulp after a lapse of two or three years or more, upon the application of ice in direct contact with such teeth.

Again, it has been affirmed by a class of observers in certain localities that in most cases in which the pulp has been found to be dead after this treatment, there had been little or no pain or soreness or disturbance of any kind after the operation, and that when the pulp chambers of such teeth were opened, they and the root canals were found to be entirely empty and free from moisture or evidence of decomposition. These seem to be the prominent and noticeable facts concerning this practice, and in view of the last mentioned might it not be suggested in answer to the objections urged by some "that the pulp is certain to die sooner or later in most cases;" that if it dies in the manner as claimed by some as above stated, and the interior of the tooth is found in the condition named—is it not then in better condition than it would be likely to be in, in a majority of cases, had the pulps been destroyed in the usual manner?

With reference to the details of the operation, it should be strenuously insisted that the greatest thoroughness is essential in removing all diseased structure and cleansing the cavity of all debris, that no irritation may arise from those causes after the completion of the operation. Again, great care should be exercised to avoid irritating the pulp beyond what is absolutely necessary, and in applying the oxy. chl. zinc it should be allowed to flow over the exposed point, and should never be pressed until it has thoroughly hardened. To the neglect of some one of these vital points may unquestionably be traced some if not most of the failures which have occurred in cases of recent exposure.

The great irritation and pain produced by the immediate

contact of the freshly prepared oxy. chl. with the exposed pulp, even when a layer of bibulous paper saturated with creosote is interposed, would suggest the propriety of the adoption of some mode which should lessen, if possible, this pain and irritation.

In this connection the practice of Dr. Geo. O. Howard, of Galena, Ill., is worthy of trial. He uses a preparation of which the following is the formula:

Saturated alcoholic solution of morphia, one part; three and one half parts ether. In this mixture dissolve as much gun cotton as it will take up. With a camel's hair pencil he applied a few coats of this over the point of exposure before flowing over the oxy. chl. zinc.

This preparation he claims adheres closely to the tooth and pulp, forming a pellicle that will not crack, and under which in some cases, with the aid of a lens, the pulp may be observed distinctly to throb.

This he claims prevents to a great extent the pain which generally follows the application of the oxy. chl. zinc. The cases in which treatment by oxy. chl. is most successful are unquestionably those of quite recent exposure, where there has been little or no pain previous to the operation. The cases likely to prove less successful are those in which the pulp has been long exposed, with more or less pain, but with slight disorganization of the structure of the pulp; and those cases least likely to succeed are where the pulp is more or less ulcerated or gangrenous. In the latter cases perhaps the best practice is to secure, if possible, by treatment with creosote, or otherwise a sloughing off of the diseased portion of the pulp; when, after that has taken place, careful manipulation and thoroughness in details, as in the cases of recently exposed pulps, may give some hope of success.

In concluding these remarks upon this subject, it should be observed that the operation under discussion is one requiring great nicety of manipulation and an understanding of what is being done, and it would be absurd to expect uniform results in

miscellaneous practice, when so great a "diversity of gifts" must necessarily exist among the profession at large.

But the conclusion must be forced upon every candid mind that in view of the general testimony in its favor, the practice of capping exposed pulps with oxy. chl. zinc has been proved to be the most successful thus far introduced to the profession tending to the preservation of the life of the Dental pulp, and may justly claim to be a very important adjunct in operative Dentistry. It certainly demands the careful, thorough study and experimental investigation of the profession as giving promise of the highest results in the direction of conservative practice.

We come now to the consideration of the somewhat startling views of Dr. Arthur, as promulgated in his book published a few years since, in which he advocates a very marked modification of general practice for the preservation of teeth, and insists upon a heroic use of the file as the surest means of preventing and arresting decay in these organs.

Startling as these propositions doubtless were to the profession generally, the careful consideration of them may show them to be not entirely devoid of reason. In advocating such a practice, the author has to contend against the strongest prejudice probably which ever settled itself in the minds of men, both with certain members of the profession, who are numerous, and with a large portion of the public.

That Dr. Arthur's views are extreme there can be no doubt. No man would be likely, after elaborating in his own mind such a system, as the result of years of study and observation in that particular direction, to announce it to the profession without occupying very extreme ground; but that all his propositions should be characterized as wild and unworthy of thoughtful consideration, does not follow at all as a matter of course. This report could hardly claim to aim at completeness did it ignore Dr. Arthur's views, as although they can not be said to be fully adopted by the profession, or the practice they advocate to have become to any extent

general, yet there can be no doubt but that practice generally will be largely modified in the coming years through their influence.

Dr. Arthur presents for our consideration a system, the result of long and careful observation and experiment, and sustains his views by much sound reasoning and some very plausible arguments. Views presented under such conditions are always entitled to thoughtful consideration, however erroneous they may appear at the first glance, and it would be strange indeed if no good were to be found in them, if the search instituted be after truth.

That the teeth may be filed away to a considerable extent without greatly increasing their liability to decay, it is believed admits of no question. The proposition that dentine, if sound and thoroughly polished, will resist destructive agents nearly if not quite as well as enamel, can hardly be controverted, and that judicious filing will not only arrest but prevent decay to a great extent, must be apparent to every observing practitioner of long experience. That all the teeth back of the cuspids should be separated with the file, whether decayed or not, in case the incisors are decayed before the twelfth year, this report is not prepared to admit, but that a more general and more thorough use of the file as a means of prevention, would, under Dr. Arthur's method, in certain cases, prove of vast benefit, there can be no doubt. Accumulated experience seems to tend to confirm this view, and it is not improbable that the next ten years will demonstrate to a large extent the soundness of the major part of Dr. Arthur's system.

It must be understood that this report does not admit the propriety of *indiscriminate* filing, but of *judicious* filing, and it should be remembered that certain classes of teeth under certain conditions will scarcely admit of filing at all; certain others of filing only to a limited extent, while some may be filed away to a very great extent without injury or serious objection. It should ever be borne in mind that in speaking

of operations or methods, reference is made to their performance as they should be performed, thoroughly and perfectly, and in considering the different modes of practice we should not lose sight of the fact that because certain modes fail in some hands they do not necessarily fail in all. It is not unreasonable to suppose that where failures are the rule with some, and yet that the same operations are generally successful with others, that the failures are largely due to the absence of some of the conditions within the power of the informed and skillful operator to supply, which are essential to success.

In coming now to the consideration of the latest and most marked change in practice in regard to filling teeth, that is the substitution of heavy foils for those formerly in use, we are brought to the discussion of the most complete revolution in ideas and practice that the profession has ever witnessed. So great was this revolution, that although the fact is established beyond controversion that heavy foil is the material above all others for securing the best results, yet its advocates have hardly ceased to wonder that so great a change could have become so quickly established or to so general an extent as this unquestionably has. When Dr. Atkinson suggested the use of heavy foil one year ago, there were probably very few in the profession but that regarded the proposition as the vagary of an enthusiast. To-day the practice may be said to be becoming very general.

When it is borne in mind that the tendency for some years has been toward lighter foils, and that many of our best operators regarded No. 2 as the best adapted to secure the highest results, and when we consider that this change in practice proposes to substitute for numbers 2 to 6, numbers 30 to 240, the magnitude of the revolution becomes apparent. But in spite of the seeming absurdity of this proposition, it is believed that there are sound philosophical reasons to support the claims made in behalf of the heavy foils.

The endeavor will be made briefly to state these reasons and

to further state what experience seems to have established concerning their use. To reconcile this proposition with the principles of philosophy, it is only necessary to consider how light foil is used. It is prepared for filling by being folded upon itself a greater or less number of times, according to the mass required and the particular use to which it is to be applied. This is the manner of its preparation, whether used in pellets, blocks, cylinders or strips. It presents then, when thus folded a mass from ten to forty times as thick as the foil from which it is prepared. If prepared from No. 4 foil it would represent by multiplication of thicknesses Nos. 40 to 160 of heavy foil. If then, ten to forty layers of No. 4 foil can be packed successfully, why not one layer of 40 to 160. Practically, this would be more easily accomplished, because when light cohesive foil is thus folded upon itself, it is always with a greater or less degree of irregularity, and the force required to condense a mass thus prepared must necessarily be greater than for a single layer of same thickness, because the mass of folded foil presents innumerable surfaces and angles braced in every direction against each other and cohering at every point of contact, which offer a much greater resistance than a single layer corresponding in thickness would do, while there are largely increased surfaces to weld together.

It would seem to be unnecessary to say another word in support of the philosophy upon which the claims for heavy foil are based.

With regard to what experience has demonstrated concerning their use, it may be said that as high as No. 60 is applicable to all cases where the mallet can be used, even in the most frail teeth, when those inexperienced in its use would think it must surely fail. But it seems to be established that foil as heavy as No. 60 is peculiarly adapted for use against frail walls, that it is in fact vastly superior to the light foils. It accommodates itself to irregularities with great facility, requiring but slight force to place it properly

and thoroughly in position, and in fact gives immediate support to the frailest wall, and renders operations in such cases less difficult and dangerous. No. 60 for filling retaining pits is much better than lighter numbers, making more certain and solid anchorages.

The higher numbers of foil are very much more cohesive, and consequently when properly packed must make a stronger as well as more solid filling, while owing to this greater cohesiveness as well as the greater softness of numbers as high as 60 and upwards, really less force is required to condense them thoroughly than the numbers from 2 to 20.

In one class of cases the heavy foil seems to possess peculiar value in binding one part of the filling to another. For instance, where a cavity in a bicuspid or molar extends from the approximal surface over to the crown, where the approximal cavity may be very shallow, and as is frequently the case, it is impossible to secure thorough anchorages, either at the base of the cavity or elsewhere, but where strong anchorage can be obtained in the crown cavity. In such cases, after securing as thoroughly as possible the base of the filling in the approximal cavity, and thorough anchorage in the crown, a narrow strip of No. 120, well secured to the crown filling and carried over to the approximal portion, and so carried back and forth two or three times, will secure the approximal portion as no other method could possibly do. So, too, in building across the ends of the incisors where there are approximal cavities running into the groove across the cutting edge or surface; this method secures the approximal fillings from any possibility of becoming displaced. In this class of cases it is believed that the heavy foils enable the performance of operations of a more reliable and durable character than could be attained with any other material. In building out and restoring the contour of the tooth, especially on the cusps and across the cutting edges, where great strain comes upon the filling, the much greater strength which the heavy foil gives, is invaluable, and renders such

operations less experimental than they have some times been considered when made with the light foil.

One feature peculiar to heavy foil deserves especial notice, and that is that it spreads more laterally in condensing than the light, a fact which should be carefully borne in mind, as the same mallet force applied throughout an operation with heavy foil, as would be used with the light, would in some cases fracture the tooth, and often check it to a greater or less extent. To sum up in a word the merits of heavy foil, it makes when properly used the most perfect operations that have yet been attained.

It is objected by many that the profession is wild about this matter, that too much is claimed for this practice, and that until the test of time has stamped it with the seal of approval, it should not be claimed as a success.

This would seem to be not an unreasonable proposition, and as to new methods and practices generally, is unquestionably a proper caution to observe; but the matter under consideration seems to be exceptional in that it carries conviction of its permanency with it. It seems to be susceptible of demonstration to those who have used the heavy foils that there can be no failures chargeable to the material or method—that the assurance of permanency is as positive now as though years had added their testimony.

It can not be feared for this material, as in the case of "plastic gold, that after a time fillings would be found to be disintegrating and crumbling away and failing at the margins." Gold plate does not disintegrate, and if heavy foil is properly placed over the margins of cavities, there can be no crumbling at that point. These operations have been submitted to the severest tests possible, except that of time, and the most powerful lenses and the most delicate points fail to discover any evidences of weakness or failure, while the working of the heavy gold carries conviction to the mind of the operator, as the working of no other ever did, that strength and durability are the marked characteristics of the

new method of practice. It has been urged by some that they fear by and by it will be found that fillings are falling out, or leaking at the margins. Have the gentlemen who have these fears never seen failures or leaking at the margin from the use of light foils? There has not yet been discovered any material for filling teeth that renders unnecessary the use of brains.

It is not expected that the highest results will be reached with heavy foils through careless or slipshod operations. But it is believed that thoroughness and skill will produce higher results with heavy than with light foil; that those who produced fillings with light foil that did not leak at the margin, will produce them with more certainty by the use of heavy foil; and those whose fillings of light foil did not drop out will make them of heavy foil with greater promise of durability.

Perhaps not the smallest merit of the heavy foils is that of the almost impossibility of the conscientious operator making an imperfect operation without knowing that it is so. Very many operations conscientiously performed with the light foils have failed because of the deceptive appearance and imperfect evidence of thoroughness to the operator in the various stages of the operation. In condensing masses of light foil it is very easy to be misled by superficial appearances, as a pellet of light foil may sometimes seem to be thoroughly condensed and to have cohered throughout its whole mass, which is only superficially condensed and is attached to the filling by few and largely separated points of cohesion, while such is hardly possible to occur with the heavy foil.

Every step of the operation must be thoroughly performed, and the operator is aware of this fact from the evidence continually before him.

It is not claimed in this report for heavy foils that they greatly facilitate operations; on the contrary, in most cases it is thought that more time is required than with light foils;

but a far higher claim is made for them, viz: that they bring the conscientious practitioner nearer to the goal for which he is striving—perfection in his operations!

No man who desires to secure the highest results should rest contented with old methods until he has given the heavy foils a thorough and impartial trial.

Before leaving the subject of changes and improvements, it is proper to refer to the methods of performing operations for the removal of salivary calculus, and of polishing the teeth, the importance of which is daily becoming more fully recognized by the profession, and the manner of performing which is receiving a degree of attention more in accordance with its importance than formerly.

A marked advance has clearly been made in this direction both theoretically and practically, and has been materially aided by the improved and delicate instruments which have more recently taken the place of the old fashioned and clumsy forms which were illy adapted for the work; while in certain cases the rubber dam comes in as a most important and indispensable aid to complete thoroughness. In fact progress is the watch word of operative dentistry in all its details. But the already extreme length of this report precludes any further elaboration of minor points, though a chapter might appropriately be devoted to the operation of pivoting teeth.

Under the head of materials used for filling teeth, only preparations of gold will be considered. Of Watts' crystal gold it is unnecessary to speak; its reputation is fully established, and though having comparatively few advocates, yet it is unquestionably true that very superior and durable operations may be and are made with it.

Brief mention will be made of such preparations of gold as are in any sense new, within the period which this report proposes to cover. The preparations known as "Morgan's Plastic" and "Lamm's Shredded" gold are those most noticeable, as although they are among the things that are past as far as occupying a prominent position before the profession

is concerned. they deserve notice here for the brief hour of triumph they enjoyed, and also because in the case of the plastic" it still fulfills certain indications better perhaps than anything else.

The first of Morgan's plastic gold which was offered to the profession was better than any since manufactured, and seemed to give promise that better results might be hoped for from its use by the general practitioner than had been previously attained by the use of foil. Experience, however, soon demonstrated that for general use it was not as reliable as foil, while the deterioration in quality, which was soon observed, forced some of its warmest advocates early to abandon its use. The unwise advocacy of some of its earliest friends in the promises held out by them of extraordinary facility and rapidity of operating which might be attained by its use, encouraged a degree of carelessness in its application which was reprehensible and unfortunate to the last degree. The inevitable consequence of this soon became apparent in rapidly disintegrating fillings and the speedy recurrence of decay at the margins of others which apparently remained intact.

It can hardly be doubted that much more harm than good resulted from the introduction of this form of gold. And yet very fine operations were made with it and can be still. There are in existence operations which were made with it when it was first introduced that will compare very favorably with the best then made with foil. These, however, were obtained as all first class operations are—by thoroughness, care, and time—skillfully bestowed. But it can not be doubted that the use of foil secures less disastrous results in general practice than any form of crystal gold.

The plastic gold, however, is in some cases of great advantage still, as in the case of certain cavities, the base of which is necessarily left concave, and where difficulty is experienced in making secure anchorages by retaining points. In such cases advantage can be taken of the quality of this form

of gold which admits of its being packed upon such a surface without rocking, thus enabling the operator to secure a firm base for his filling more easily than could be done with foil. After which the filling can be completed with foil.

Of Lamm's gold it may be said that it never was as popular as Morgan's, and the same general objections to Morgan's apply also to this, and its use was always more limited and is now believed to be exceedingly small.

Of the different qualities of foil there is not very much to be said; very many manufacturers making a superior article and each having his especial advocates among the profession.

Of the light foils, mention may properly be made of corrugated foil, manufactured by R. S. Williams, of New York, as being new, in that it was corrugated. For some reason this seemed to work more satisfactorily than the foil of the same manufacturer which was not so prepared. With many operators this was and is a very favorite form of gold.

Of the heavy foils the same general remarks are true. All first class manufacturers make a good article, and the only make which it would be proper to distinguish from others in this report is the rolled gold.

This unquestionably possesses in a greater degree than any other foil the requisites of a perfectly cohesive foil; that is, softness, pliancy, toughness and cohesiveness. This might naturally be expected in a foil which is not produced by hammering; the latter process depriving gold to a certain extent of the qualities above enumerated. Another style of heavy gold has quite recently been introduced, called "Eureka," made by Mr. Pack. This has not been in use long enough to warrant this report in speaking particularly of its merits, but theoretically it ought to possess the requisite qualities in a high degree, as it is understood to be produced by rolling, though with some modifications of the process as followed by Mr. R. S. Williams, the manufacturer of the rolled gold first alluded to. Whether these modifications tend to improve the quality of the foil is not known, and experience only will

determine. It may be remarked in closing this reference to materials, that, properly manipulated, any heavy foils of first class manufacturers will produce the highest results attainable with any form of gold.

Under the head of appliances introduced tending to render operations both more simple and more nearly perfect, it is the duty and pleasure of this report to name as foremost of all such appliances the "rubber dam."

In June, 1864, at a meeting of the New York Dental Society, Dr J. W. Clowes, in behalf Dr. S. C. Barnum, of New York, formally presented to the profession as a free gift, this improvement, which had but just previously been devised. It is not too much to say that Dr. Barnum gave to the profession in the "rubber dam" the greatest single invention towards perfecting the operative department of dentistry that has ever been given to it since the commencement of its history. And it is but proper that this report should pay the just tribute of thanks to the author of so valuable an improvement for the manner of its presentation to the profession. It comes without fee or royalty, a gift laid in a true professional spirit upon the altar of science! What higher praise could be spoken?

It might be deemed inappropriate that such words should be spoken here; but when it is considered how very rarely such an opportunity presents itself for such acknowledgment, the propriety of this public recognition of an act of generosity handsomely performed must be conceded.

The introduction of the rubber dam may be said to have inaugurated a new era in the practice of operative dentistry. It renders possible the performance of operations which, without its aid, could never be performed. It simplifies operations which under skillful hands were possible before, but only possible under great embarassments, and only to the most skillful in the use of those means which were then known for excluding moisture from cavities to be filled. It simplifies all operations in which it can be applied (and that

is in almost every case) by securing immunity from moisture, thus relieving the operator from all anxiety on that score, enabling him to concentrate his attention upon the operation exclusively, and to give all the time necessary for its most thorough performance. In the preparation of many cavities, a free observation of which is obscured by a too great flow of saliva, or by blood in cases where the cavities extend below the margins of the gum, the dam is almost indispensable, and is of essential service where continued applications are required to cavities for the purposes of bleaching or medication.

It is valuable, also, in many cases in the performance of operations for the removal of salivary calculus and of superficial decay. Enabling the operator in the first case to see minute particles which would otherwise escape observation, and in the other case to more thoroughly examine the surfaces of the teeth affected with disease.

Its value is inestimable, and no man who desires to secure the highest results and to most largely benefit his patients, can afford to be without it.

Unfortunately its use is not as universal as it should be, mainly because of the seeming difficulty of its application to beginners. Many are discouraged and do not persevere because they fail to apply it successfully and easily at the first few trials; but no man should rest satisfied until he has mastered the manipulations necessary to its successful application. There is nothing in the details of practice that will so well repay the operator to acquire as the knowledge necessary to the proper application of the "rubber dam."

The nearer approach to perfection in the manufacture of instruments, particularly of pluggers, which has been attained quite recently, and the many admirable forms which have been introduced to the profession by various operators during the few years last past, have contributed materially toward the improved practice of the present day. Of these, the set known as "Varney's pluggers," manufactured by S. S. White,

deserve especial mention for their admirable forms and the very superior manner of their manufacture and finish.

One of the most admirable instruments tending to lessen and render more perfect labor in this department has been laid before the profession during the past six months, in the shape of a "Pneumatic Burring Engine," the invention of Mr. G. F. Greene, of Kalamazoo, Mich., a gentleman not of our profession, but an inventor to whom the profession is largely indebted, not only for the instrument itself, but for the demonstration it affords of the practicability of the application of the mechanical forces to instruments to be used upon the teeth. This instrument, as its name indicates, is operated by air, which is drawn through a chamber in which are placed the rotating arms which give motion to the elongated shaft running from this chamber. In the end of this shaft are to be fitted, as required, burrs of various shapes and sizes.

The motion is very rapid and uniform, rendering the instrument entirely manageable. The purpose of this instrument is to lessen the labor of, and secure greater perfection in the operating of burrs and drills, both for opening cavities and for finishing fillings. It works admirably for both these purposes, and the ease and rapidity with which a large filling may be dressed down, and the perfection of the operation when effected with this instrument, must be witnessed to be appreciated.

There is also an attachment by means of which drills and burrs may be used in the reverse direction, or at any angle from the main shaft, thus enabling the operator to shape more satisfactorily and easily certain cavities upon the posterior of molar teeth, and to make retaining pits which without some such apparatus could never be effected. It is believed that this is the first instrument proposing to operate drills and burrs at different angles ever invented, which could be said to be at all of practical value. There is also an attachment for carrying a file which is, in some cases, of

utility. But the great merit of the instrument lies in its admirable operation in opening cavities, burring off fillings and removing superficial decay in places otherwise almost inaccessible.

The instrument must take rank among the most useful which have ever been offered to the profession.

Another instrument, working upon an entirely different principle, but aiming to secure the same results, has quite recently been invented by Dr. J. B. Morrison, of St. Louis. It has not been sufficiently tested by the profession generally to have acquired any reputation, but from what the committee have seen of its operation in the crude and imperfect apparatus exhibited, they are inclined to think that it has some points of merit which in a perfectly constructed machine would make it superior to any other yet produced.

In the introduction of the mallet for condensing fillings, a long step in advance was made, and it has steadily been growing into favor, until now it is rare to find an operator who does not use the mallet in some form, either the hand or automatic.

The first mallets introduced were quite light and made of elastic material, either wood, hard rubber or ivory; but experience has demonstrated the superiority, for general use, of a heavy, non-elastic mallet.

About four years since the leaden mallet, weighing from six to eight ounces, was introduced to the attention of the profession by Dr. Forbes, of St. Louis, and has been in quite general use at the West for nearly three years past. More recently it has attracted the general attention and is growing more and more into favor daily. Doubtless it will soon be universally adopted.

Its great merit consists in its being less objectionable to the patient, while it is easier for the assistant to use, requiring less care and skill to insure an effective blow.

The philosophy of this would seem to be found mainly in the fact that heavier bodies moving at lower velocities diffuse

their force more throughout bodies struck than is the case with lighter bodies moving at high velocity, in which case the blow is struck so quickly, and the force imparted in like manner, that there is not time for it to be diffused to any extent beyond the tooth. The force in this case is as it were concentrated upon the tooth and its immediate surroundings. This would seem to be the explanation why the heavy leaden mallet is less disagreeable as a rule than the lighter, elastic one.

Of course there are cases in which the light mallet will be preferred, and there are certain cases in which a heavy, *soft-rubber* mallet will be found much less disagreeable to the patient than any other. Strange as it may seem, the soft-rubber mallet condenses the gold very satisfactorily, and for burnishing is much more effective than any other, as a much heavier blow may be struck with it with less discomfort to the patient.

From experiments made regarding the action of different materials as mallets, the soft rubber would seem to possess equal vis viva with the lead or lignum vitæ, while the diffusion of force in the case of the rubber closely approximated that of the lead. This again appears very strange, in the light of experiments referred to, as the elasticity of materials of a hard texture seemed clearly to be the chief influence lessening the diffusion of force, while the rubber a more elastic material than wood, shows greater diffusion of force than lead.

These facts are mentioned as being curious, not with any view to attempt their philosophical solution.

Practically we must learn by experiment in the mouth what is most desirable to use, and it is confidently affirmed that careful experiment will establish the superiority of the heavy, leaden mallet for general use.

With reference to automatic pluggers it may be remarked that most of them operate upon similar principles, and that for certain purposes and cases they are very available, and

in fact valuable, but that nothing has yet been perfected in that line which successfully takes the place of the mallet, intelligently and skillfully used by a competent assistant. The nearest approach to this has been made in the "pneumatic mallet," invented by Mr. G. F. Greene, of Kalamazoo; but this is very far from perfect yet.

A pneumatic mallet, invented by Hyde, as supposed, and of which W. H. Jackson & Co., of Ann Arbor, are proprietors, gives promise of a nearer approach to what is desired, but as at present constructed and operated can be said to possess but little merit. It seems unfortunate that its proprietor or inventor is unwilling to take the advice of experienced men in the profession, and endeavor to improve the instrument, for it is believed that within it are folded the elements of success, and that if fully developed the instrument might become a very valuable one, even though it did not entirely supplant the hand mallet.

A want has long been felt by the profession of files of fine quality and proper shapes for the more thorough finishing of fillings and of roughened surfaces of the teeth, where resort has been had to the file either for the purposes of removing superficial decay or for prophylactic treatment, and it would seem proper in this report to refer to the source from which such superior files may be obtained. These files, of a great variety of forms and of very superior quality and fineness of cut, are manufactured by Vautier and by Baumel & Fils, and can be obtained of G. A. Huguenin, 64 Nassau St., New York.

In submitting this report your committee do so with a realizing sense of its many imperfections, but in the belief that the most prominent features of change or improvement in methods of practice, in materials used, and instruments and appliances introduced, tending toward improvement or simplification of practice, have been fairly stated. Of course it would be impossible in such a report, which already

exceeds reasonable limits, to follow out in detail all the steps of progress.

The conclusions arrived at in the discussion of subjects must necessarily largely reflect the individual views of the writer and the other members of the committee; but the endeavor has been made, in dealing with all these points, to reflect the general view of the profession, so far as it could be ascertained in matters of practice, and as to experience regarding methods which are to a large extent occupying debatable ground.

The consideration of the influences tending to modify this department of practice should naturally occupy a place in a report of this character, and it was hoped that another member of this committee would have undertaken that task; but such not having been done, your indulgence is asked for the briefest mention only, of some of the main points which seem prominent among such forces, that their mention may perchance suggest thought and stimulate to greater activity the already largely progressive spirit of the profession. The influences tending to progress are to be chiefly found in an ambitition to excel, a desire for distinction, and a wish for the greater benefit of humanity.

These impulses, when controlled by that higher and holier spirit, the possession of which alone should entitle a man to the distinction of being considered truly professional, must eventually result in the very highest degree of human attainment.

When, however, these holier ends are subordinate to those of personal ambition and selfish gain, they are materially dwarfed in their possibilities for good. Happily the spirit of liberality is growing in the profession, and there is cause for congratulation thus far and greater hope for the future.

Of influences tending to retard improvement, may be mentioned the ignorance of the public touching the mutual relation existing between the profession and themselves, which

is most prominently evinced by their unwillingness to recompense justly the highest order of professional attainment, and which finds support and encouragement from the willingness of so many members within the ranks of the profession to pander to this spirit, not of illiberality, but rather of unjustness, born of ignorance.

The force of such influences is very great. If "man can not live by bread alone," it is certainly essential that he have bread, and the temptation under the pressure of necessity to accommodate practice to low demands, rather than to try to educate the public to an appreciation of that which alone ought to be done—the very best in all cases—is so great that many men having the possibilities of greatness latent in them, keep those innate powers hidden at the expense of their patrons and of their own higher development.

It may be broadly asserted that no man should remain in the profession one moment after he ceases to command a just or sufficient recompense to enable him to render to his patients the highest professional skill within his power to give. Our motto should be "Excelsior;" but placed above that should be "For the love of God and humanity—a conscientious discharge of our duty." When this high principle controls our profession, we shall see more gigantic strides made in the progress of our science and art, and we may feel that after we are gone from our present field of labor, "men will rise up and call us blessed."

ESSAY.

CYLINDERS.—METHOD OF MAKING AND USING THEM.

BY J. S. KNAPP.

Among all the different forms in which gold is used for the purpose of filling carious teeth, none deserves more attention than that indicated in the subject of this chapter.

Those who desire to acquaint themselves with methods that have been successfully employed by some of the most distinguished dental operators, must not fail to learn the art of making and using gold foil cylinders. All descriptions of varied, nice manipulations must be more or less imperfect. These must be learned by *seeing* and by practice as well as by theory.

No other apology is offered by the writer for any imperfections contained in his descriptions, or for any unintentional omissions.

First, let the operator seat himsef at his desk, with a clean velvet surface on which to do the folding of the gold, provided also with a suitable little shallow box with several compartments in which to deposit cylinders of different lengths and degrees of hardness when made.

A pair of small, fine, ivory paperfolders are essential to use in folding the gold.

A suitable instrument on which to roll the prepared strip of gold is necessary, and for this purpose a fine watchmaker's pivot broach, with its fine equal sides, is quite appropriate. By cutting off the blade of the broach within about one-quarter of an inch from its little handle, and then bringing it to a tapering point by sharpening it on a fine stone, preserving the distinctness of its sides, it is ready for use as a roller.

Fine and sharp scissors are required to cut the gold sheets to the proper width for folding, instead of tearing them, as

is often done in other preparations. In regard to the thickness or number of gold to be made into cylinders, it is proper to remark that the writer of this chapter used a great variety of numbers as early as the year 1851, ranging from No. 3 to No. 30. He is, however, settled on the belief that Nos. 4, 5 and 6 are better adapted than any others, and that the first one (No. 4) is the most suitable for general use.

Gold possessed of ordinary adhesiveness is preferable to that in which this quality obtains in the highest degree, which is so requisite in the introduction of gold by the welding process.

When *very* large and long cylinders are required, the entire sheet of No. 4 or 5 may be folded without cutting. To make up the great variety of sizes adapted to the variety of cavities to be filled, some of the sheets must be cut into two equal parts, and others again into three, four, five, six or more parts of equal width. The narrowest strips, of course, are intended to make short cylinders for cavities of the smallest size, while the widest pieces are designed to be made into cylinders of the largest size and for the largest cavities.

Each piece or strip of gold cut off with the scissors is to be laid on the clean velvet surface and gently indented with the edge of the paper folder lengthwise from end to end across its center.

This will enable the operator to bring the two opposite edges together with a light touch of the little folder. The operation of indenting and folding is to be repeated in the same manner, making the strip half as wide and twice as thick each time till the width of the strip is equal to the length of the cylinder required. There is a degree to which the folding, if done too much, makes the strip so stiff that it can not be easily rolled, and great care must be observed in folding not to put too much pressure on the strip with the folder, as it hardens too much.

The last one or two indentations, in case of a narrow strip intended for short cylinders, should be made by gently plac-

ing the edge of one of the folders in position, and then putting the other folder under the right-side half, bringing it to bear against the first placed folder. A light touch with the ivory lays the two parts of the strip together. In this manner the strip is made of the desired width, and then one end of it is held between the thumb and forefinger of the left hand, with the edges last folded towards the left. With the handle of the rolling broach in the right hand, its point is laid just across the end of the strip, when the thumb and finger already holding the broach on the end of the strip are moved, drawing the thumb back, and extending the forefinger in a way to catch the broach in the end of the gold while the broach is rotated by the right hand; repeating this till the strip or enough of it is rolled to attain the size of the cylinder, in circumference, which is required.

If all the strip be not required for one cylinder it can be cut with the scissors or torn off with the left hand thumb and forefinger, when one is familiar with the process. After rolling the narrowest strips it is preferable to cut them off instead of tearing them, as the latter operation either tightens the cylinder or disturbs it on the broach. Very narrow strips may be obtained by cutting with the scissors instead of making the last fold.

The cylinder is turned around a few times while on the broach, the end next to the handle gently touching the thumb nail of the left hand, in order to prevent it from unrolling, and is then easily removed from the latter by the thumb and finger of the left hand, and deposited in its proper compartment of the box according to its length or hardness, and ready for use.

This method of making cylinders was first pursued by Dr. John S. Clark, deceased, an eminent Dentist of New Orleans, in the summer of 1851, and to him properly belongs the credit of originating cylinder fillings. The writer of this chapter introduced Dr. Clark to Dr. F. H. Badger, who spent two or three years in New Orleans, and who was known to

use cylinders. Dr. Badger's method of making cylinders was quite different from that invented by Dr. Clark, as will be seen by reference to his description found in the *American Journal of Dental Science*, Vol. 6, No. 1, page 23; and the only use made of them by him was, after *apparently* filling the cavity with either strips or pellets, to insert one, two or more hard rolled cylinders, according as he could make room for them with a round, slightly tapering plugger. He never made the entire plug of cylinders, which credit is due to Dr. Clark, who so strongly recommended their use that they were directly adopted by his associate, Dr. Geo. I. Friedrichs, and Dr. J. S. Knapp, of New Orleans, who with others that have faithfully adhered to the plan, are so well satisfied with results that they have continued their constant and invariable use.

The largest cylinders, those that are first introduced into the cavity, are rolled up very lightly and left quite soft, so that upon lateral pressure they are easily adapted to the shape of that part of the wall of the cavity against which they rest. A great variety of sizes is needed, and the smallest ones that are last introduced are to be rolled very hard, to resemble gold wire as much as possible, and are made tapering by the manner of folding the gold, the small end being inserted first into the opening prepared for it by the plugger, when by proper pressure applied to its larger extremity it may be driven into its place.

Many of the large cylinders should be made by folding the gold in such a way as to give a little greater thickness of gold toward the handle of the broach, so that in case of an under cut in the cavity, the larger end may be put within to fill up such a shape; but always in putting in the last cylinders the large end of the small hard cylinder should be left toward the outside of the cavity. In all cases where a part of the cavity is funnel shaped, the large end of the cone cylinder is left towards the surface, so as properly to fill such a shape, while its smaller end is

wedged between cylinders differently placed and parallel to it. When the first cylinder, of a size nearly as large as can be admitted, is introduced, it should be put in position with one end against the bottom of the cavity, while the other end projects a little beyond the orifice and then gently pressed along its side, thus carrying to that part of the cavity where it is desired to retain it. If this lateral pressure be done lightly and carefully with a suitable instrument, it will be retained; if these points be not observed it will fall if gravity favors. In order more fully to explain the use of cylinders I will give a description of introducing them into some of the cavities represented in figures 1 and 2.

In the preparation of cavities it is proper to remark that no small retaining points are made for cylinders, as is done to secure other forms of gold, cylinder fillings retaining their position by the general shape of the cavities, these being prepared a little larger within than at their orifices when practicable; and in all cases there must be an under cut at least one-third the distance around the cavity within its orifice. In figure 1, letter B, a soft cylinder, about one-half the circumference of the cavity, and of a length a little greater than the depth of the cavity should be selected, one end of it being slightly larger than the other; it should be seized carefully with a delicate pair of tweezers, their very points taking hold of it near its smaller end, and not passing entirely across its diameter. It can then be carried and placed with the tweezers very near where it belongs. Light pressure then applied to its under side and not on its end, will adapt it somewhat to the cervical wall against which it is to rest.

The next cylinder should be about half the size of the first one, against which it should be placed one side or the other, favoring that to which gravitation would tend, when with gentle pressure on its lower side it can be made to stick to the other cylinder, and rest also against a part of the wall; the next

one will be about the same size, probably one end no larger than the other, and introduced in the same manner.

The next and fourth cylinder may be quite a large one, and if necessary so arranged that its end, slightly larger than the other, shall be left outside the orifice of the cavity. Greater pressure on its under side can now be applied than it was safe to apply to those previously introduced. But four or five more are required apparently to fill the remainder of the cavity, after which the aim of the operator should be to pass the plugger or piercer point, as it may be termed, *between* the cylinders instead of *into* the end of any one of them, so long as they can be distinguished; then follow the first piercer with another round pointed plugger or piercer of a larger size, thus increasing the opening and preparing room for the introduction of a cylinder of the same size as the opening prepared for it in the incompleted plug or filling.

As this cavity involves the distal side of a superior bicuspid tooth and encroaches a little on its grinding surface, the part of the cavity nearest the latter location should have three or four conical cylinders with their larger ends slightly projecting from the orifice at that point.

It is easy, by *seeing* the gold already introduced, and by feeling with the plugger point, to ascertain if there be places so wanting in density as to require more gold, which can be introduced usually in the form of slightly tapering cylinders in the manner already indicated.

It is well so to arrange the first few cylinders that there will be plenty of material at and near the cervical wall, in order that the operator may not be required to pierce into a part of the filling so difficult to reach with the instrument in cases where the space is small.

After filing away a part of the projecting gold, however, one may with a suitable point, favored with ordinary space, insert the plugger at the part indicated, and fill the opening thus made with a suitable tapering cylinder, which can be carried to its opening, with a very fine pair of tweezers, much

more easily after it has been somewhat *curved.* But it is preferable not to be obliged to pierce the filling near the cervical wall towards the close of the operation, but to finish the introduction of gold between the center of the filling and the part nearest the grinding surface of the tooth.

In this manner of filling teeth it will be seen that solidity is attained by the lateral pressure made by inserting the plugger, and there is a surplus of projecting gold which will yield but little to the condenser, and which can be cut in any shape, and admits of a polish as fine as one desires to produce. Great care must be taken that no gold is left projecting beyond the cervical wall where *fulness*, in the use of other forms of gold, is not as easily attained.

In Fig. 1, letter E, representing the distal side of a left superior incisor tooth, the cavity having been prepared with a fair "*undercut*" at its cervical portion, a soft cylinder should be selected, as before, nearly as large as the diameter of the greater part of the cavity, and placed with its larger end inside, while the other projects slightly from the orifice.

If it be difficult to retain this first cylinder in the desired position, it can be held there by allowing the ball of one of the fingers of the left hand to rest against its projecting end as the finger is gently pressed between the teeth on their lingual surfaces; and this pressure and way of holding should be continued till enough cylinders are introduced, so they are retained by wedging and by contact.

If the adjoining tooth be very near, it may often be advisable to allow the first cylinder to touch its projecting end against it, and in this way it is easily retained, until separated from it in the subsequent process of trimming and condensing.

The first cylinder is to be pressed gently upwards, with no pressure directed on its outer end except if necessary to keep the opposite end at the bottom of the cavity. Other cylinders as large as convenient to use should be carried to the cavity and gently pressed against the preceding

ones and the walls, until the part of the cavity nearest the cutting edge of the tooth is reached, and then the plugger points are to be thrust in various places, wherever they can be admitted, and successively followed by the introduction of cylinders, beginning about the middle of the filling and ending, if possible, below that part.

The instrument, with which the upward pressure is given to the cylinders first introduced, is bent at its extremity nearly at a right angle, and is not round from the turn to its end, but is flattened and thinned on that part of it farthest from the handle, and likewise on the *inside* part of the turn.

When the mass can no longer be pierced with a small plugger, a little further condensation with a thin instrument will prepare the way for a thin file. After cutting away a little at a time, and occasionally using the condensing points, it can be finished in the usual way.

In filling the cavity represented in Fig. 1 as letter K, it is preferable to insert the first cylinder, standing it with its smaller end outside that part of the cavity nearest the buccal surface of the tooth After gently pushing it towards the buccal side, introduce another and another in the same way, holding them with the end of a finger, if necessary, till the palatine side is reached, some of them with one end slightly larger than the other placed outside the orifice, when they hold each other in place. Then if the operator thrusts his plugger between them he makes room successively for other cylinders smaller and harder than those first introduced, till the mass can no longer be pierced.

A little time and force are employed on the outer surface, and it is ready to be cut down in the usual way and finished as desired.

In filling the compound cavity represented in Fig. 2 as letter B, it would make little difference at which end of the cavity the operator should commence, though as a rule it is preferable to commence at the *deepest* end.

After placing a cylinder in that part nearest the buccal

side of the tooth, the places should be prepared for two smaller cylinders to stand next to it in the corners or angles of the cavity at that part; then all three should be pushed towards the buccal part of the tooth by pressure on the side of the large cylinder first placed, and other cylinders are to follow as has been represented in the filling of other cavities, finishing the wedging process either near the palatine side, or nearer the center of the grinding surface.

In filling the compound cavity represented in Fig. 2 as letter E, stand the cylinders from the posterior to the anterior side of the cavity, and then pierce anywhere between these two points till a solid mass is obtained; cut and finish as usual.

Be careful not to apply too much force in piercing with the plugger, which is, of course, round and of the same shape as the cylinder by which it is to be followed; otherwise a little carelessness may result in bursting such a tooth.

A small point may be first entered, and followed by one of larger size, when the latter could not have been safely used at first, directing the pressure, when piercing, away from the orifice if the walls be thin and frail.

In Fig. 2, letter G, cylinders should be put in the opening at the grinding surface at first, and lastly in that part of the cavity opening on the buccal side, and the plug, if well made, is susceptible of a fine polish.

There are some general principles to be observed in making and using this form of gold. Never harden the strips of gold in folding it by too great pressure upon it, or touch it with soiled hands or while they are in a state of perspiration.

In filling cavities in the approximal surfaces of teeth, those who are commencing the use of cylinders are apt to make them too long. Those who are uninitiated would suppose that a cylinder of a certain size could not be introduced into an approximal cavity, when by gently flattening it with the tweezers it can be carried through a small space between the

teeth at their lingual surfaces, and then turned endwise in the cavity and put in position.

No two very large cylinders should be placed in direct contact where they rest against a wall, there being room for a smaller one between them; and no very large or very hard cylinder should be *forced* against a very frail wall. A soft one can be sufficiently hardened in being pressed against it, and will be better adapted to it than a cylinder already made too hard by rolling tightly.

In a deep cavity one cylinder half the depth of the cavity may be forced towards the bottom and another one placed on its end and left projecting from the cavity; but generally speaking each cylinder should be a little longer than the depth of that part of the cavity in which it is placed. This arrangement gives a surplus of gold on the outside, which can be condensed, cut with files and shaped as desired.

When a part of the trimming is done with files the operator should stop and use his condenser on the surface of the plug, which if well put in will by this pressure be but slightly influenced.

Defects in density revealed during the process of trimming are remedied by piercing and introducing more gold.

Cylinders should not be dislodged in filing the surface; if so, they should be replaced by others better fitting the situation; or in case of serious difficulty, all should be taken out, and if necessary the shape of the cavity made more favorable before commencing the operation again.

Beginners will succeed better by filling cavities on the grinding surface of the lower molars; then let them undertake the corresponding surfaces of the upper molars, and cavities on their buccal surfaces, before commencing with the more difficult and approximal cavities.

It is well to have plenty of room, but in no other form can gold be carried through a given space and packed more solidly than in cylinders; and in no other form can gold be

introduced and made more susceptible of a fine polish—an excellent test of its solidity.

There can be no scaling off of any part of a cylinder filling properly introduced, the interior end of each cylinder being at or near the bottom of the cavity, and its entire length being so impacted between its neighbors as to be firmly retained in its position.

Lastly, there is no other way in which gold can be prepared that admits of such rapid introduction into the cavity to gain a given density, greatly commending it in instances where the abundant secretion of saliva renders it difficult to keep the tooth dry during the required length of time for other forms of gold.

THE SAVING OF TIME IN DENTAL OPERATIONS.

BY J. S. KNAPP, D. D. S.

There is no vocation which demands the observance of the old adage, "Time is Money," more than the practice of Dental Surgery.

There may be those who say they pursue Dentistry from the mere love of it, but none will dispute that far the greater number are engaged in it as men engage in other occupations, in order to earn a support for themselves and families. Only those who are fortunate enough either to have gained or inherited a competence can afford to talk of practicing their profession for the love of it as a fine art.

We should be thorough in what we undertake to do, and slight nothing in the practice of a fine art; but it becomes us to pay especial attention to those plans which are calculated to enable us to perform the greatest good in the shortest time.

If any one present were asked what are the occupations by which the time of Dentists is most consumed professionally,

he would undoubtedly say the *construction*, *tempering*, and *use* of *instruments*, the *preparation* and *use* of *gold*, and the *management* of *patients*.

First, on the *construction* of *instruments*, I admit that a great variety of these can be found at our Dental depots already made; but any Dentist who is not able to repoint and shape them in accordance with his wants, is in a *helpless condition* and is *losing time* every day.

Every Dentist, besides being qualified with good judgment to select his instruments for *strength*, *durability* and *adaptability* to the purpose for which they are intended, is subjected to great inconvenience in the actual practice of his profession, unless he be able to alter their points, making and tempering them so they can be more readily and effectually used in a manner which he understands better than it is possible for him to know who does not *use* them.

This involves a knowledge of *working* and *tempering steel*, an art which should be pursued in the private laboratory of every practicing Dentist, and taught in the laboratory of every Dental college.

I have known skillful Dentists, and those who were considered to possess profound knowledge in their profession, and who had an extensive practice in a large city, to suffer the greatest inconvenience from the want of this knowledge, the inability to make and temper their own instrument points.

The best substitute for the lack of this knowledge would be to be a good draughtsman, in order to explain and show to a manufacturer the exact form of the article required.

So important do I consid r this knowledge to insure success that I advise every young practitioner or student, who has not yet been taught the art of working and tempering steel in the laboratory of some Dentist or in that of some Dental college, to get the information from a practical worker in that metal.

When he once knows how to make and temper his own instrument points, he can economize time by preparing them on rainy days, or in hours too early or too late for the usual reception of patients.

At any rate, the instruments of a Dentist should be prepared at such hours as not to interfere with those usually employed in the actual performance of *Dental operations.*

In the use of some of the forms of gold as recommended by some of our distinguished and able Dental operators, the number of pluggers is large; but in the use of gold in the form of cylinders the necessary number is small, not exceeding ten to twelve for all the pluggers and condensers, thus showing a great saving of time if one uses these instruments and the form of gold for which they are designed.

Excavators, as made by the manufacturers, consist of a variety and number which is too great, and of many shapes which none but a man wanting in judgment would ever attempt to use. This is done by the manufacturer to please the multitude, and probably from the best of motives, but it results in a great loss of time and money.

Of course it is well to have as many duplicate points as any individual thinks he will ever have occasion to use; but if ten or twelve excavators be made in accordance with reason, sense and good judgment, an expert operator may properly excavate any cavity ever to be filled, and in less time than he who foolishly attempts to use such a great variety of cutting instruments, with each one of which he can accomplish so little.

To be plain, no matter what form of gold is to be used, I would discard all the "right and left" (so called) excavators, and many of the forms, five of which are required to make one, and let us confine ourselves to the patterns which are but ten or twelve in number. These vary in size and strength, according to the size and location of the cavity in which they are to be used.

Do not deem me dictatorial, but allow that I speak from

experience, when I say that I should advise all operators to use excavator points in plain, strong, octagonal, ivory handles, with round sockets. These instruments will last any careful man his life time, and are of a size to be handled more effectually than the small steel handles, the points of which are continuous with the handles, making the entire instrument useless in a short time.

The points can be untempered and re-made when shortened by sharpening, and can be replaced by others when use and repeated pointings have made them too short. I should recommend that the points be bent at different angles, so that some should be but little changed from the line of the handle, others a little more curved, and some bent at a right angle, with the point of connection slightly rounded, and others curved somewhat towards the handle itself, so as to make the "under-cut" in cases where such a shape is necessary to procure such a form of cavity.

These excavators are round for half an inch after leaving their sockets, and then gradually squared, to form distinct sides, and flattened in a line right and left of the handle, near the points, so that, besides cutting at their very edges, they will also cut in two ways on each side, making five cutting edges or angles for each excavator point.

Imagine, then, the execution which can be done with one instrument.

With six instruments of this kind almost any cavity that ever was known may be reached and thoroughly excavated, and prepared for the reception of gold.

When sufficient space has been obtained properly to approach the approximal surfaces of two adjoining teeth, both of which are to be filled, two or at most four excavators are all that are necessary to be used, where many operators loose time by scraping and cutting away with a dozen in each cavity, and looking and hunting among a confused quantity of excavators and other instruments to find the one they want.

After using one well formed excavator in one of these cavities, doing such execution with it as it is capable to perform, it is a saving of time, without stopping or changing instruments, to turn and use the same cutting point in the opposite place of decay.

This one instrument may cut in the middle and cervical portion of these two cavities, and another one, bent at about a right angle with its socket handle, may be made to cut alternately in the opposite half of each cavity, and make all the "under-cut" in that part which is required. With these two excavators, if properly made and used, the entire orifice of each cavity may also be trimmed, beveled, and smoothed, to aid in the fine appearance, finish, and consequent perfection of the plug.

If the cavity to be filled be on the grinding surface of the tooth, with but a small crevice leading to an extensive place of decay, one or two instruments are all that are required to open and enlarge this crevice to a size nearly equal to that of the carious dentine; and two or three excavators are enough, with, perhaps, the aid of one flat head burr and one drill point for the angles, to prepare in a very short time such a cavity for the introduction of the gold.

I am aware that many will tell me that I am talking of executing operations with more simple and fewer instruments than it is practicable to use for such a purpose, and that the rapidity is greater than patients will endure.

In regard to the simplicity and small number of instruments here represented as capable of such work, any one can prove it by trying them himself, or by *seeing* others use them. It is necessary, of course, to use a little persuasion to influence the patient to keep still and endure what is for the good of the one operated upon; and if Dentists were to try the more protracted method of using more instruments and occupying a greater length of time, the patient would not like it half as well, and would suffer much more pain.

I have thus spoken of instruments and the rapidity with which they may be made to execute, as a general rule, to which, owing to the great variety of cavities, their corners, angles and complications, and the difference in the fortitude of patients and their controllability, there are exceptions.

In the preparation and use of gold there are such widely different views entertained by different operators, that whatever form of this material might be advocated it would be liable to be severely criticised by the advocates and followers of other methods and forms.

I am one of those, who, after having tried gold foil in strips, ropes, and pellets, and sponge or crystal gold (as it is to be used in its invariably slow process of being packed), and gold foil cylinders, have arrived at the conclusion many years since, that in no form can this article be so quickly packed and condensed to a given size and solidity as by the latter method. The cylinders can be prepared before or after office hours, if one is pressed for time, and made in such variety as to be ready to meet the wants of any ordinary case, each one that is introduced being of such bulk as to fill far more rapidly than it is possible to do with the narrow strip or small particles of crystal gold that are used in the welding process.

If any determined, intelligent and skillful operator will give this form of gold a faithful trial he will like it the more he uses it, and will be satisfied that, after its introduction, it is capable of being trimmed and receiving a given finish in less time than is requisite in fillings made of most if not *all* other forms of gold.

Practice and perseverance in becoming acquainted with the best methods of making and using cylinders will result in such a saving of time and such facility that saliva pumps and rubber dams may be discarded, while such solidity is attained that no patient in the hands of a Dental operator need be subjected to the unpleasant jarring operation of malleting, and no Dentist need waste his hours in that tedious

and protracted process, with an assistant to aid him in the operation.

In conducting the affairs of a Dental office and the management of patients there is much to observe, by which not merely minutes but hours per day can be saved.

When a Dentist is engaged operating for one who has previously secured the time by appointment, he is liable to many interruptions from a variety of causes.

Persons call to make appointments, to pay or collect bills, and some call to have teeth extracted or pain alleviated, and some are in quest of "*cheap Dentistry.*"

There is no necessity that these hindrances should take up one-half the time they usually consume.

Promptness and the use of a few well chosen words will create promptness in others who would not otherwise feel and see that they are occupying time which belongs to others, and prevent them from taking more of it than is actually necessary.

It may be good policy some times to allow a patient undergoing a regular sitting to see an extracting operation, if it be not a protracted and difficult one, but never in the latter case should unconnected parties see what may give them a wrong impression, making them blame the Dentist, and perhaps discourage them from undergoing a similar operation.

An operator is excusable for leaving his patient a very short time for all necessary interruptions, but not so for engaging in idle talk with those who have nothing to do but pass their own time in a profitless manner and steal that which belongs to another.

Neither is he excusable for occupying an unreasonable length of time in any operation.

In extracting teeth, firmness of manner and self-possession combined with gentleness and sympathy will generally operate to inspire confidence, and in most cases prevent that desire on the part of the patient, so often manifested, to

delay, by which many lose so *much time* and *patience* and numerous *patients*.

We should never deceive children in regard to extracting their teeth, when it is to be done, or allow parents to tell them in our presence those falsehoods which so affect them afterwards that they are hard to manage, and serve to make them doubt the truth when they hear it.

In preparing sensitive teeth for filling, it is quite possible for one Dentist to manage and operate successfully on a patient for whom another Dentist can do nothing. The difference is in deportment, voice and words; and he will save most time who exercises these aright, and who can exert the greatest moral force and will-power over his timid and but half reasoning patient.

I regret that, in this age of progress in Dental science, there should still live some who think they will save time by placing arsenic in sensitive teeth, in order that they may afterwards more quickly prepare them for filling.

Perhaps one of the most frequent causes of loss of time to the Dentist arises from the ignorance or thoughtlessness of patients.

They do not always understand that while they are talking or occupying far more time than is necessary in rinsing their mouth, and that their hour is fast gliding by, and that another patient has a right by appointment to the succeeding hour. It is best to state the facts, and to use a gentle reminder that the time is passing. Better be occupied in actual operations rather than in profitless talk.

Much time may also be saved if the operator will hold the tumbler to the mouth of his patient only as often as he deems it necessary, instead of allowing the patient to handle the glass and rinse *ad libitum*. Timid and young operators frequently loose much time by failing to put their patient in the most convenient position for them to accomplish what is to be done.

Time wasted by the patient holding his head over the spittoon may easily be shortened by a gentle touch on the shoulder, when the head goes at once back to its place, and the operator is ready to enter his mouth with his left hand forefinger, or that and the thumb of the same hand, followed immediately with the instrument in the right, just as if he expected it had a right to do so.

Let us follow these simple directions, and do no cheap Dentistry (so called), and make patients pay for the hours they consume, and much more time and money may be saved.

LIGHT *VS.* HEAVY GOLD FOIL AND CRYSTAL GOLD.

BY FRANK ABBOTT, D. D. S.

In nearly every journal devoted to the interests of the Dental profession, in nearly every Dental society, and in the private conversations of Dentists with each other, the subject of the different preparations of gold for filling teeth is referred to, and the supposed merits of each canvassed, in some instances to an enthusiastic extent. This has been more particularly the case recently or since the introduction of "heavy foils."

There was a time, probably in the recollection of some of our oldest practitioners, when it was impossible to obtain any but heavy gold; in fact, I have heard Dr. Eleazer Parmly state that during the first years of his practice he manufactured or prepared his own gold for filling teeth, which was done entirely with the rolling mill. At that time that was the best preparation of gold known to Dentists. It has since been the constant desire of many Dentists to obtain lighter foil. Some have even gone so far as to require it as light as 1½ grs. to the sheet. Recently, however, the views and practice of many have changed, and they now require gold the same sized sheets, weighing from 10 to 480 grains. If you ask those gentlemen what advantages they derive from

the use of these preparations, they will tell you that they can "work more rapidly," "make more perfect fillings," that they "can pack more gold into a cavity of the same size than they can of light or soft foil," and in short "it is the material with which perfection in filling teeth is arrived at.

Other gentlemen in equally as good standing in the profession will say that perfect plugs can not be made with such heavy materials, but claim that with crystal gold the greatest degree of perfection is obtained. They will tell you that they can pack one quarter more of this gold into a given sized cavity than they can of any other preparation. And if any doubts are expressed in regard to the truth of the statements of these gentlemen, you are immediately written down an old fogy, a non-progressionest, or some other equally as interesting appellation. Now there is a class of Dentists who doubt very much the truth of these assertions; a class too, who are as fond of advancement and do as much to advance the profession as any connected wi h it. This class is represented by those who believe their time and energies are spent to a better advantage in using materials and teaching young and inexperienced men in the profession how to use materials, with which it is well known teeth can be saved, than in advocating the use of that which many believe tends to destroy untold numbers of teeth which might with some substance less difficult to adapt to the irregularities of cavities, have been saved. Imbibing to some extent the views of this latter class, and feeling that it was due as well to the profession as to the public, that a correct solution of the question of the best preparation of gold for filling teeth should be made, I have carefully conducted a series of experiments in the following manner and with the following results: I first had several cavities prepared in steel of precisely the same size, to resemble nearly as possible cavities in teeth. In order to accomplish this more perfectly, several fine cuts were made in each with a graver, to represent the cuts of excavators, at the same time they were so arranged that the entire

mass of each plug could be removed without marking its surface. This done, gold of the following numbers was then prepared (taking care that the pieces should all be as nearly the same weight as possible), viz: Nos. 2, 3, 4, 5, 6, 10, 20, 30, 40, 60, 120, 240, adhesive foil, and Nos. 3, 4, 5, and 6, soft foil, and Watts' crystal gold, No. 1.

An automatic mallet, with the same weight of stroke, and the same point, was used for each operation. The time occupied in condensing each was as follows:

No.	2,	adhesive	14 minutes.	No.	40,	adhesive	28 minutes.
"	3,	"	14 "	"	60,	"	31 "
"	4,	"	14 "	"	120,	"	35 "
"	5,	"	16 "	"	240,	"	36 "
"	6,	"	17 "	"	3,	s'ft or non-adh.	11½ "
"	10,	"	18 "	"	4,	" "	12 "
"	20,	"	21 "	"	5,	" "	14 "
"	30,	"	24 "	"	6,	" "	16½ "
"	1,	Watt's crystal gold,	14 min.				

On removing the plugs, after their surfaces were finished, I found that Nos. 3, 4, 5 and 6, non-adhesive foil and the crystal gold plugs all presented the appearance of having been perfectly adapted to the cavities in every particular, while all the other cavities were more or less imperfect, even the very light Nos. 2, 3 and 4 presented innumerable minute openings into the body of the plug, and the fine cuts made by the graver were not perfectly filled, and as the gold increased in thickness, the imperfections increased correspondingly, so that from No. 10 to No. 240 there was hardly an approximation to adaptability. The cuts of the graver were not filled; every point where the gold was folded in the least an open space was left; in short they presented an appearance which might very appropriately be called the height of *imperfection.*

The weight of each plug was as follows:

No.	2,	adhesive	15½ grains.	No.	60,	adhesive	13½ grains.
"	3,	"	16 "	"	120,	"	15 "
"	4,	"	15½ "	"	240,	'	15 "
"	5,	"	16 "	"	3,	non-adhesive	17 "
"	6,	"	16 "	"	4,	"	17 "
"	10,	"	14½ "	"	5,	"	17¼ "
"	20,	"	14 "	"	6,	"	17 "
"	30,	"	15 "	"	1,	crystal gold	14½ "
"	40,	"	15 "				

With the above facts before us, what becomes of the assertions that with heavy gold "time is saved;" "that more perfect operations are made," and "that more in weight can be packed into a cavity than can be of soft or non-adhesive gold of light Nos.? These questions I leave for the advocates of heavy and crystal gold to answer. In summing up this matter it seems unnecessary to add that the light Nos. of soft foil present decided advantages over any other material experimented with.

1st. It requires about one-third the time under the same circumstances to manipulate them.

2d. Cavities are apparently perfectly sealed with them, while all the others, except crystal gold, present more or less imperfections; and

3d. From fifteen to eighteen per cent. more gold in weight is with the same pressure packed into a cavity.

DISCUSSIONS ON OPERATIVE DENTISTRY.

Dr. Carroll: Before the discussion opens I want to make a remark in reference to the terms cohesion and adhesion. Dr. Knapp used the word cohesion where it was not applicable. Cohesion is where the particles of a body are attracted to each other; adhesion where they stick to something else."

Dr. Morgan: In regard to the use of the cylinder, Dr. Clark has the honor of introducing it, but I have no doubt that F. A. Badger used it before Dr. Clark. He showed Dr. Clark his first filling. I have in my possession a tooth filled by him in 1834 and devitalized at that time. It was filled when the gentleman was 16 years old. The case is that of General R. C. Foster, of this place, a perfectly reliable man. I extracted the tooth when the filling was of thirty years standing. This tooth is filled with cylinders.

Dr. Knapp: It matters little who did it first. I have no doubt Dr. Morgan is correct, but it must be remembered Dr.

Badger did not institute the cylinder for filling teeth. He told me he did not use cylinders except when he pierced the plug after filling with strips. When a person says that cylinders were used years ago, I say they mean blocks, not cylinders. To Dr. Clark is due the honor of introducing cylinders, though it does not matter who did it.

Dr. Morgan: I never saw a strip in one of Badger's plugs.

Dr. Fouchè: As the subject of the cylinder is raised, I will state that my preceptor, J. P. Norman, though not by any means a first class operator, used in my presence cylinders before the time referred to.

Dr. Walker: While I agree with Dr. Knapp in reference to the value of the hatchet shaped instrument, I have never been able to reduce my need for many instruments, and this increases on me as I grow older. I need them not only to remove brown decay, but also the soft bone, where we must not go too fast nor cut too much away. While cylinders are good for regular cavities, we must use something else for irregular cavities. Where the cavity is not well situated, and you have to build out cusps and make contour fillings, it is best to resort to other forms of gold.

Dr. McKellops: Dr. Clark was the first man who demonstrated the use of cylinders to the profession, whether he invented them or not.

Dr. Bogue: We might with profit consider other points connected with the practice of our profession, as for example the arrangement of our offices; how we may keep them clean; the manner of our deportment toward our patients, etc.; points which I have never heard spoken of, and which should come before us. Patients are leaving elegant operators on these grounds. I have had occasion to feel these inconveniences myself from the use of unclean napkins and instruments. And now I would allude to Dr. Carroll s criticism. Cohesion means sticking with; adhesion, sticking to. The New York sur-

geons criticise us severely on our use of terms, for instance, eye-tooth instead of cuspid. We speak of tartar instead of salivary calculus. We hear of destroying the "nerve" where the pulp is meant.

Referring to Dr. Knapp I repeat a remark which has been made, that is not to be doubted but that a filling may be produced by cylinders which can not be excelled. Where the tooth is considerably broken down cohesive foil may be used, but it is very evident cohesive foil can not be put in small corners. But, as he said, teeth must be filled with judgment as well as gold. We must adopt no "*isms.*" I am confident that there are operations which can not be performed with cylinders. We must be eclectic.

Dr. Carroll: In regard to the criticisms of the surgeons of New York, I have great confidence in their judgment; but the difference between the Doctor and me is in reference to the Latin prefixes *co* and *ad.* If he will find *co* meaning *together with*, I will give it up. Soft gold is cohesive, but not always adhesive. One authority is the dictionary, another, writers on physics and philosophy. Cohesion is defined by them to be the attraction of like bodies to each other.

Dr. Allport: I hold in my hand a letter. That stamp *adheres* to the envelope. The particles which make up this fan *cohere* together. A piece of gold is held together by cohesive attraction, and the pellets one with another by adhesion.

Dr. Dennis: I understand adhesion to mean a union of unlike substances; cohesion a union of like.

Dr. Dean: The term cohesion as used by writers on chemistry and physics is that attraction which holds together like atoms of matter, when brought in contact. It holds together homogenous bodies or atoms of the same kind. Whereas adhesive attraction is the force which holds together unlike particles or heterogeneous matter. A pellet of gold foil that sticks to another must be held by cohesive attraction.

Dr. Mills: I have taken a uniform interest in all the discussions, and I am yet at the feet of Gamaliel. The paper read by Dr. Cushing was the best I ever heard on this subject—going over all the ground and meeting all questions that may arise. Allow me to say we lose time because we pursue our discussions on personal prejudice. We have come here to learn truth. I have been seventeen years in practice and have never been so imbued with the desire to live out of prejudice and stick to truth. The main point in filling a tooth is the preparation of the cavity. This is Dr. Atkinson's rule, and it is the correct one, though I entirely disagree with him in his manner of operating. I do not condemn cylinder practice, however. In my practice success lies in the preparation of the cavity. When that is done I feel as though the work was almost accomplished. Dr. Knapp wanted only a difficult operation to perform this morning. I do not think we gather much from difficult operations. We learn just as much from the simpler ones. A great many embarrassing circumstances surround our clinics, and I do think we show more credit to ourselves by simple operations than by difficult ones, for the manipulations are exactly the same. In reference to the number of instruments, I agree with him. I reduce the number of mine as much as possible. The principles embodied in so many may be advantageously combined in one. In my practice and from observation of others, I have come to the conclusion that we use too many. Dr. Varney uses thirteen, four of which are fillers. This is especially an important point with men of nervous temperament. I have put down one instrument and taken up another in filling a tooth, until I was very much confused. Dr. Wetherbee showed me his five-sided excavator, like one which I formally used, but had forgotten about it. He reminded me of this by showing me his, and I have been using it ever since and find it of great value.

The hour of adjournment having arrived, Dr. Mills took his seat and next day resumed his speech, as follows:

I was referring to the excavator mentioned by Dr. Knapp and to the reduction in the number of instruments by the shape they are made to assume. Dr. Brockway gave me a good excavator, concave on one side and convex on the other, a sort of *scoop*. This is very efficient, doing away for the most part with burs. My manner of filling teeth is, first, to separate by immediate wedging. In the preparation of the cavity I use a chisel, a few excavators, and this scoop. After reducing to straight square margins, I dress these margins. In the use of gold, I may say, I have gone through the whole category, and am convinced that foil is the best form. I am also strongly in favor of amalgam. During the last year I have used heavier foils than formerly. I used the sponge gold for two years. I believe a first class operation can be performed with it. I do sometimes use Morgan's gold and do not see any impropriety in doing so. I might say, however, that I use foil almost universally. I use none below No. 8. I use mostly Nos. 10, 15, 40 and 120; the last three are preferable. I prefer No. 120, and any man who has used it will bear me out. Great care is needed in packing, and good foil is the best form of gold that can be used. I am satisfied that the heavy Nos. are the best. I do not agree with Dr. Abbott. His experiments are of no value to me whatever. I believe the great point is not so much the packing as the preparation of the margin of the cavity. In condensing the gold here we can go farther with the burnisher than anything else. It should be welded down with this so as to draw a shaving over the margin. I have seen this done in Dr. Atkinson's office. For this you must have the gold beaten down, not broken. And when I say beaten I do not mean heavy strokes, but be easy with it. We can always use the burnisher. And here gentleman allow me to say we have a great deal to learn yet. We produce a great deal of unnecessary pain. In my prac-

tice I have come across two cases where the mallet could not be used. My judgment pointed out the proper course to pursue. I believe, however, a revolution has commenced in favor of the heavy foil.

Dr. Knapp: I am no advocate for the use of cement. Yet I think there are cases in which it may be advantageously used. I wish to call attention not to the different kinds of cement, but to a solution which I hold in my hand for *washing cement.* It is Labarraque's liquid—the chlorinated oxide of sodium, which has been recommended as better fitted for washing cement than anything in use. Take one-half water and one-half of the solution and rub up the cement with it, and then use alcohol at the last washing.

Dr. Dickerman: In treating carious teeth my method is to remove all the carious portion, and dress with camphorated spirits. You can line the cavity with oxychloride of zinc.

I use, in filling, various thicknesses of gold, Nos. 2 and 4 generally. I like No. 100 for some purposes. I don't believe in filling with sponge gold. I consider foil the best. There may be cases in which *cement* might be profitably used, but still much caution is necessary. There is too great a tendency to catch at such things, arising from imperfect education. We have had abundant evidence of this lack of training. I think it a feasible plan to select three or four of our best men and send them out among the profession to *teach.* We would do better to pay one hundred dollars to have ourselves taught before attempting to teach the people. The medical profession are not willing to acknowledge us as their peers, because we are not educated as they are. But we are fast coming up.

Dr. C. Palmer: My subject is the continuance of that which I took up last year. I endeavored to show the description of the mouth in relation to practice. It is a subject of deep interest to us to know how to keep a dental record, so that we may record operations at the time they are performed, at which time we are better able to know how much vital force has been expended, and to say what it is worth. I offer you

a system by which you can record readily any kind of operation.

Dr. Palmer then exhibited his diagram showing his system of recording. He then went on to speak of the use of cylinders in filling. He said that no first class operation could be performed with them. He charged the profession not to use manipulated gold. He said it should never be handled, for when the gold is taken out some years after, it will be found to have an offensive odor, which is never the case if the cavity is properly filled with gold untarnished by handling. He then explained his manner of filling with gold, as follows: After cutting out a fissure, take a file and file the margins down. Form the cavity by cutting to the crown surface. Don't be particular about beginning in the bottom of the cavity. Find the posterior angle, make the material react to the buccal and lingual wall, then build forward, condense laterally, carry forward to the anterior wall, change across to the labial wall, and you will carry the gold in all directions against the walls. That's a first class operation. Anything short of that comes short of the highest attainment. It has been stated that a more solid filling can be made with cylinders. This is not true; the most solid filling can be made with the best adhesive gold. It is principle that I am trying to teach. Not that I am more perfect in carrying it out than any one else. I again protest against handling gold with the fingers. I prefer M. M. Johnson & Co.'s foil to any other. I have adopted this to the exclusion of crystal gold, Morgan's gold, sponge gold, etc. I do not object to heavy foils. I prefer No. 4.

The dental depots are full of all sorts of instruments not worth anything, and until the profession gives encouragement to manufacturers they need not expect any better. They can not make fine instruments without the employment of talent, which must be paid; and as every dentist can not make his own instruments, he should encourage the manufacturer. In reference to the use of the mallet, I would say

there is no operation which can not be reached with mallet force. The use of the mallet is not generally understood. It should not be applied with a nervous jerk and then suddenly taken off. It should be applied steadily and continued on the instrument until the force is expended. Lead is the best substance for the mallet. It is the only substance that does not rebound. The instrument should be held firmly on the gold.

Dr. Palmer mentioned a case of atrophy in the teeth of a a little girl 10 or 12 years of age. The four superior and inferior incisors were affected that way. There were ridges and pits extending two lines from the cutting edge on the lingual and labial surface, and little grooves. He drilled out the pits and cut down to the sound material, leaving the lines of enamel appearing between the lines of gold. He used the rubber dam and wedge, having an assistant to use the mallet. He then showed models of the case before and after treatment.

He then continued in reference to the mallet: An eight ounce lead mallet is the best. The lead has to be confined some way. I here show you a mallet covered with Swede's iron fire plated with silver. He exhibited different sizes of lead mallets thus covered, adding that he did not wish to be known as an instrument maker. His forte was in designing, and what he did was to help the science, and for the good of the profession, he exhibited these mallets merely as models.

Dr. Walker: Describe the preparation of gold foil.

Dr. Palmer: The making of gold foil is confined to the manufacturers, and they will not tell how they make it. The best adhesive foil presents the brightest surface, but if you take it in packages and put it under a press, one-third of its adhesive property will be destroyed. Don't handle it when preparing it for use. Hold the book between the first two fingers and cut off strips. Take a nice linen towel, not rough, and fold it double. Lay that on a table and the foil

on it flat. Fold the napkin over the foil and roll it gently into a rope. Cut it in short pieces and use it in that way, not in pellets or wads. In passing it through the spirit lamp it should not be handled. Use a lamp with a platinum or glass tube for the wick, and it should not be lit with a match.

Dr. Carroll: Suppose the gold should be fused? Would that injure it?

Dr. Palmer: Not at all, if you only keep it pure.

A member: How would you fill a front tooth?

Dr. Palmer: Take the left superior lateral incisor anterior proximal surface. One fourth of the labial wall has to be cut away to give an edge. Cut this away, then straighten off. Don't mind about the form the decay has given it. Get the labial wall perfectly square, so as to have strength.

Dr. Atkinson: Tell them why.

Dr. Palmer: I have found that to be the fact by experience. I don't know exactly why it is so.

Dr. Atkinson: It is stronger because you get it in the line of the enamel rods.

Dr. Palmer: Start with the chisel (the most convenient form of which he exhibited), then a file to prepare the edge. Prepare the lingual edge in the same way. After getting the edges all right, begin with an instrument and excavate; carry straight across the cervical wall, then with a fine instrument lower the apex of the cavity. That is the preparation of the cavity. Now protect with the rubber dam, which is as indispensable as the use of the mallet, and then wedge. Make hooks according to Dr. Varney's method for holding the dam. (He here presented and explained the use of his instrument, which he called the "0.") Now "0" holds, No. 1 fills the pit, then No. 2 foot, to build the gold so that it connects; then No. 3 foot long enough to reach to the edge of the cervical wall. Continue until the gold fills one quarter of the cavity, then use the curve modeling instrument and condense laterally. When you get that done use No. 4

curved foot (which he exhibited and explained), then No. 2 foot, working toward the lingual wall. When the cavity is filled use the curved modeling instrument and your operation is complete. Go over it again and again with a condenser, then very thoroughly with a burnisher.

Dr. Palmer then exhibited a burnishing instrument, which he said met the case exactly. He passed his designs around among the members, and they were generally admired.

Dr. Forbes: In the paper of Dr. Knapp he spoke of reducing the number of instruments. In proportion as we become familiar with the use of them, will we want fewer instruments. It seems to be the interest of manufacturers to multiply the number. That is like some dentists who sell their students their old instruments, when they of all others need the best that can be had. Why, Dr. Atkinson, could take an old broken excavator and fill a tooth as well as an inexperienced student could with the finest instruments in the world. It has been said that we could learn more by sending one man through the country to teach. We need the right kind of teaching. What was I taught? That napkins need not be scrupulously clean, and that when there was debris in the tooth from operating, it could be blown out by the mouth of the operator! We dentists take liberties in operating for each other, holding the instrument in our mouths, etc., when we ought to be as particular as though we were dealing with the most delicate and fastidious patient.

It has been said that a first class operation could not be performed with cylinders; that teeth could not be built up with cylinders. I deny it and I'll prove it.

Dr. Forbes then explained his method of cylinder filling. He concluded by saying the mallet was the best labor-saving machine that could be used.

He referred to Dr. Palmer's characters for recording operations, and compared the relative value of them to the plan which they adopted in St. Louis.

Dr. Atkinson enjoined them not to spend time in the details of practice. The proper place to work them out was at home. He stated that if the contour was properly restored, he had as soon have the filling in the tooth hollow. He charged the profession to glorify no man, but to magnify truth. He censured those dentists who placed their students down in the laboratory and never let them stand by to witness an operation, which was the proper method of teaching. On this point he laid great stress on the doctrine, "Freely ye have received, freely give," and concluded by saying that a man was either wicked or weak who would destroy a pulp, for "while there's life there's hope.

Dr. Stellwagen showed some models of splints for fractured maxillaries, and explained their mode of operation.

Dr. Palmer occupied the short time allotted him in explanation of principles by the various instruments he had prepared. Being pressed for time he could not enter into a full description of their operation, but circulated them around for more minute inspection.

In reference to bleaching teeth, Dr. Atkinson said: If the tooth was discolored I should get the root in a healthy condition; then use the crystals of oxalic acid. If that would not do, then try chlorine, which may be easily made by the following formula:

$Mn\ O^2 + 2\ H\ Cl = Mn\ Cl + 2\ HO + Cl.$ 1 part Blk Ox. Manganese + 2 parts Hyd Chl Ac = Chlor Mang + 2 water + chlorine gas.

Put the materials in a little bottle, a quinine bottle is very convenient, and let a bent glass tube run through the cork, so as to apply it easily. Be careful and not let the patient breathe it, for it will produce spasm of the glottis. Here is where your rubber dam will come in. All the chlorides will bleach. Common salt is about as good as any.

REPORT OF THE COMMITTEE ON DENTAL EDUCATION.

BY M. S. DEAN AND J. N. CROUSE.

MR. PRESIDENT: In the report of last year your committee dwelt upon the importance and necessity of a *good preliminary education* for the dental student, and urged the Association to demand in future a thorough English education, at least, of their pupils before admitting them as students of Dentistry.

Your present committee would emphatically reiterate this sentiment believing that no amount of professional study can fully compensate for the want of it, and that our specialty can never attain an honorable position among the professions until its members rigidly insist upon this essential prerequisite.

With this brief reference to preliminary education, your committee will proceed to the subject of office and college instruction, in regard to which, in some respects, there is considerable diversity of opinion, even among the leading members of our profession. With all due deference to those whose opinions may differ somewhat from their own, your committee will point out what they consider some of the faults in the present system of dental education, and endeavor to suggest some improvements in the course of instruction to be pursued by the student.

It is a well established truth that theory alone will never make a man successful in any department of active life. He may be thoroughly acquainted with all the facts relating to his special avocation, yet fail entirely as a business or professional man. To attain success he must combine practice with theory. This seems to be a general law, and in accordance with it your committee will endeavor to call more earnest attention to the subject of office instruction, believing that the student should be taught not only the theoretical

principles of dentistry, which are so imperfectly laid down in many of our text books, but more especially their application as demanded at the chair and in the laboratory. In the preceding reports upon dental education, very little has been said about office instruction. It has either been regarded as a relic of former years, or as unworthy of notice compared with collegiate education. But to your committee it seems vastly important that the student should receive, in addition to a full course of collegiate education, thorough and systematic instruction in the different departments of study, and in the *practice* of dentistry, in the office of a competent and conscientious practitioner.

But just how long the pupil should study in a dental office, or just how far he should be advanced in the different branches of study before it is advisable for him to attend a Dental college, is a matter difficult to determine. Yet, in the opinion of your committee, he should receive his first course of lectures as early as possible, or at least as soon as he is sufficiently acquainted with the different branches taught, to understand and fully comprehend the lecturer; although this session might be less laborious to him and more agreeable to the professors, had he more thoroughly mastered the fundamental branches—especially anatomy, physiology, and chemistry—before entering his first collegiate course.

By taking this course early, through the guiding influence of professional instructors, he will be more apt to start aright and to keep on in the right direction; and on his return to the office of his preceptor, he will be more certain to pursue a thorough, systematic course of study than he would otherwise do. For the dental college, if it is what it should be, has an inspiring influence upon the student, and stimulates him to generous emulation in his class, and makes him ambitious and zealous to excel in his professional studies.

Of laboratory instruction, but little need be said. Since the introduction of rubber for artificial plates, dentists gene-

rally have regarded this style of work so important to their students that they have kept them taking impressions, making casts, vulcanizing, etc., until the poor pupil has come to consider this mechanical drudgery the scientific part of dentistry. Of course the preceptor has not been at all selfish in this matter. The highest good of the student has been his controlling motive. He realizes that if the student would be successful, he must be enthusiastic, and as the surest way of kindling his enthusiasm, he places him week after week and month after month amidst the very attractive and inspiring surroundings of the workshop! Now without being understood as detracting from the value in the least of a proper laboratory instruction, would it not be better for the student instead of consuming so much of his time with these inferior manipulations, that he receive more of his preceptor's time in teaching him the more difficult parts of plate work, selecting and arranging teeth in a skillful and artistic manner, and the working of the different metals? And yet the policy of placing laboratory instruction, so prominent as to overshadow the most important branch of dentistry—the operative—is decidedly objectionable.

Too much can not be said in favor of thorough instruction in the operative department. Daily practice at the chair is of the utmost importance to the student's after success. He should procure his own patients, and perform his own operations under the strict directions of his preceptor. Close attention and criticism on the part of his preceptor are invaluable to the student while in this department of study. Let his work be progressive, from simple to the more complicated and difficult. The student may thus be enabled to see the substantial progress he is daily making, inciting him to renewed efforts and diligence. No defects should be allowed to pass unnoticed. Neatness and precision should be inculcated in such a manner as not to discourage the student, who sees so much at this point to learn.

If it is objected that the practitioner can not spend so

much time with his student as would be required by this method of instruction, it may be answered, he should receive a proper compensation for his services. To this reply the objector may say that poor young men could not enter the profession if an adequate fee were required for instruction. It may again be answered, the dental profession is not an asylum for paupers. While every reasonable favor should be extended to worthy young men, our profession should not be degraded to accommodate those who are too indolent to acquire the means necessary to pursue the course indicated. By raising the standard of preparation, and asking a just compensation for instruction, a better class of men will join our ranks. Young men without means, if possessed of sufficient talent and ambition to prove an acquisition to our number, will find ways of securing the funds necessary to prosecute their studies. Our colleges will have fewer dunces, and will graduate better dentists. The people will be more satisfactorily served, and our noble occupation will take a higher position among the professions.

But before the profession reaches this elevated position, our schools of instruction, their advantages for a complete dental education, their facilities for learning, must likewise be improved and increased.

The number of reputable dental colleges now in active operation is nine, while the list of graduates emanating from these is not more than three or four for each professor. This state of affairs would seem to show, in the opinion of your committee, that there are a greater number of dental colleges than are needful or profitable; that there is too great a disproportion between the number of these institutions and the students; in fact, that there are too many of them that are so feebly supported that it must be impossible for them to furnish adequate facilities and the very best qualified instructors. These colleges are—the most of them certainly—supported to a considerable extent by the teachers, instead of the teachers being supported by the colleges. And while this exhibits

a noble and self-sacrificing spirit on the part of the professors, the question arises, are they serving the best interests of the profession? Are they really a benefit to the dental student? Not, are dental colleges promoting the interests of the profession and benefiting the student—for this no one will deny—but would not the interests of the student be better served if there were *a less* number of dental colleges? Your committee are of the opinion that they would. For although it can not be denied that some of the very best talent is now employed in our colleges that can be found in the profession, it can not, on the other hand, be denied that the teacher who gives his services gratuitously, who takes the time from his office business that he employs in the preparation of his lectures, who devotes the time to teaching which is absolutely needed for the relaxation of the mind and the recreation of the body; it can not be denied, we say, that the teacher who works without compensation, with limited facilities and appliances for instruction, and with a meager class to instruct, must fail to be as useful and successful a teacher as if he was fully compensated for his services, and had ample time and every needful facility for instruction. But a complete corps of such professors can not be employed in our colleges until the number of pupils is greatly increased, or the number of colleges greatly diminished; and until that time shall come the dental student can not acquire that complete professional education which should be obtained for the amount of time and means bestowed upon it.

While it is true that there are some who may be found willing to work for the good of the profession, who may teach for the love or the honor which the avocation affords, making up in zeal, perhaps, for what they lack in proper scientific preparation for teaching, yet their labors can only be of short duration. Teachers can not live a long time upon the honor which a professorship in a dental college affords. This sort of diet, though pleasant to the taste, is not sufficiently nutritious to sustain the most ambitious for a great length of time.

The stability of our colleges must depend upon a more secure and substantial foundation.

By establishing a few educational centers in favorable localities, instead of planting a dental college upon every hill-top—or in every flourishing city, with an adequate staff of capable professors, men of enlarged views and eminent for learning, possessed not only of the highest mental and moral qualities, but also endowed with the *gift* and familiar with the science of teaching, and by supplying these schools with every possible facility for instruction, the student may be enabled to receive a far better dental education with no increase of time or expense, and our colleges would be more prosperous and self-supporting institutions. Then the title of D. D. S. would be an honor to its possessor, and its possessor would be worthy of the honorable title.

But, it may be said, the standard of *dental* colleges here presented rises far above the present position of the best medical colleges in the land, which is true. But we need not entertain any fears of surpassing these in education, even if we do in usefulness and skill; for the medical colleges will also make the science of medicine both easier to attain and more worthy of attainment than it now is, although the facilities for the education of the medical student are now much greater than are those of the student of dentistry. They suffer far less from the want of text books adapted to their use, and their faculties generally are more thoroughly educated. We shall have to raise the character of our dental institutions not a little before they stand on a level with the medical. This must and will be done, however, and unless the present onward course be checked, will soon be accomplished.

But to accomplish this our office and collegiate instruction, not only, need improvement, but our text books also, for these are sadly deficient and defective. Yet in the fundamental branches of study we stand equal to the medical profession, for in *these* we borrow our text books from it. We have also works on operative and mechanical dentistry

that come up closely to the times; but aside from these we have no text books which treat of the special branches of our profession that are really worth the name. On physiology, pathology and therapeutics, and even oral surgery, there are no standard text books worthy of being placed in the hand of the student. He must take those which are prepared especially for the student of medicine, which however will answer every purpose until he wishes to apply their principles in his special practice. The student suffers more from the want of complete systematic text books that are adapted especially to his wants, than from any other cause. With such as are furnished him he must work to a great disadvantage. He must grapple the science at arm's length and waste much of his strength and energies.

In our common schools vast improvement is constantly being made in the text books and the methods of teaching. But how is it with the professional student? Save in our own specialty, he is plodding along over the same old road that the ancients trod, and which in some places has been but little improved since the days of Æsculapius. The same old obstacles lie in the path that have been there for the last century, and only where worn down by the feet of these disciples, are as difficult to climb over as ever. Our profession is really the most live, progressive profession of the present age. And our colleges, too, are doing as much in pulling it along, in bending and inclining the professional twig, or more perhaps than all the other agencies put together; yet we must not allow them to halt in their glorious march for a moment, but encourage them to advance as rapidly as possible. For every improvement they make in their system of education we must demand of them two more.

Shall we then, it may be asked, require them to give the student in their colleges a full medical course of instruction in addition to that in dentistry? Your committee would answer, emphatically, yes. Yes, when these two professions may be

perfectly mastered in the time which must now be devoted to one. Yes, when the plan of instruction has been perfected to such a degree that they can be taught as one harmonious whole; when the medical and dental text books are so perfected and arranged as to blend together, each part adapted to the others making a complete unity. Yes, when this medical education will not be acquired at the expense or neglect of a most thorough course of dentistry. Then, and not till then, should we require a full course of medical instruction as a part of our professional education.

Your committee are of the opinion that the dental profession should not demand of their pupils a higher degree of professional education than is required of the general practitioner of medicine. Nor should his term of pupilage greatly exceed that of the medical student, which it certainly must do if he become doctor of both. And, as the practice of these professions should be kept distinct and separate, his professional studies need *necessarily* embrace only those branches of medicine which shall add to his qualifications as a dentist. This being the case it only remains to be determined what particular branches and what proportion of these branches should be embraced in the course of dental study.

If we can acquire only a certain amount of knowledge, if we must be limited in our acquisitions, we should obtain that which would prove the most available and the most useful in our daily avocations in life. If students have the means and the capacity to become Doctors of Medicine and of Dental Surgery, so much the better. To such great honor and respect are due. But such medical colleges as may confer the degree of Doctor of Dental Medicine or Surgery, in which dentistry is incidentally and inadequately taught as the collateral, and not the main department of education, should be shunned by every dental student and denounced by the whole dental profession. For such institutions, in adding a dental professor to their faculty, only use him as a decoy to increase the number of their students. These remarks do

not apply to those medical colleges which may, and very properly, too, teach the elements of dentistry, but to such as may award dental diplomas without giving a complete course of dental education.

But just what should constitute the course of study which would make the best practical dentist, and at the same time store his mind with such a knowledge of the sciences as to make his labors a pleasure instead of a monotonous routine, your committee will not attempt to definitely determine. There is no doubt, however, that general anatomy, physiology, pathology and chemistry, should be the fundamental studies of the dental student, and that these should be thoroughly mastered by him. Then he should be supplied with *improved* text books specially pertaining to the teeth and adjacent parts, on anatomy, physiology, surgery, chemistry, therapeutics and histology, besides those on operative and mechanical dentistry. Here we have a range of study that comprehends and embraces all the student can acquire in a three years' pupilage, and which would require more time than is usually given to medicine or law.

But the time must come, and is not far distant, when the dental student, aided by the improved machinery of instruction, will go over a more extended field than has been here laid out for him, and reap a more abundant harvest of professional knowledge.

But while the young profession is advancing as rapidly as it is at present, the *Dental journals* and *Dental associations* must act a prominent part especially in *perfecting* the education of the dentist. Unless the graduate in dentistry pay close attention to the dental journals which contain the monthly fashion reports, and carefully note the changes in style that are constantly being made, and unless he attend the dental associations, where the different modes are discussed, and where each member assists the other in remodeling his professional toga, he will soon find the elegant robe which he wore so proudly from his *alma mater* out of fashion when compared with the

newer ones of the next class that succeeds him. These magazines and societies are indispensable sources of instruction to the collegiate, as well as to the practitioner who may have been less fortunate in his earlier professional education.

In conclusion, when the dental student is required to possess at least a good English education before entering upon the study of dentistry, and when he receives such office instruction as a conscientious educated practitioner will be likely to give him; when the text books are better adapted to his special wants, and when the number of our colleges are in reasonable proportion to the pupils taught, and the faculties are selected from the most accomplished teachers that can be found—men of the highest mental culture and soundest moral qualities, and withal adapted by nature as well as education to the science of teaching; when the professors are as liberally supported as are men of marked ability in other professions and callings, and when our colleges are furnished with every appliance that can aid the student in acquiring the most knowledge in the shortest time and in the easiest way; then our specialty will be composed of professional men in the true sense of the term, and will not be obliged to *assert* its claim to the title of a liberal profession; for this honor will be freely bestowed on it. Then the graduates will go forth as the coin from the mint, with their true professional value stamped upon them, and bearing such a moral impress of the institution from which they emanate that it will not be effaced by professional strife in after years.

ADDITIONAL REPORT ON DENTAL EDUCATION.

BY S. J. COBB.

Mr. President and Gentlemen of the American Dental Association:

Your Committee on Dental Education, having divided the subject, Drs. Dean and Crouse having taken office and college instruction, I propose a few remarks touching upon what may be termed popular instruction or education. A division of the subject would seem to indicate brevity in what I should say at present, especially when we take into consideration that I prepared a paper pretty much upon the same subject that was read before this society at Niagara Falls, two years ago. As such I assure you that I will not consume more of your time at present than will enable me to make a few simple suggestions. Now that we have organized and disciplined ourselves sufficiently well, to announce to the world that we are a scientific, learned profession, it becomes our duty to make known to the masses of the people the value and importance of their teeth. This must be done before we can legitimately claim from them that respect and honor so much desired by all. How to do this is the question. In the first place it is unfortunately true that only a few persons understand enough of the laws of health to enable them to appreciate these organs, and in the second place the masses know so little of us as a profession that they do not call upon us for such assistance as we are capable of rendering them. To remedy this we must become dental educators as well as practitioners. We must teach the people to know more of the importance of their teeth, as well as the way and means of preserving them; make them see and understand that their general health depends very much upon a healthy condition of the mouth. I fear, gentlemen, we do not attach as much importance to this part of our duty as we should. We must not fail to understand that man is a creature of education, that his mind is as susceptible of being

moulded as the clay that goes into the mould to make the brick.

This understood and we see at once the importance of casting the mind of each and every individual in such a mould as will make it healthy, vigorous and active, in other words a mind able to comprehend and understand enough of the great living principle to enable one to take hold and appropriate such and only such things as are calculated to contribute to his comfort, either mentally or physically. The manufacturing of this great mind mould is the business of everybody, but more especially those best calculated for the work, and as we claim to be able to contribute very much to man's comfort and welfare on earth, it is especially our duty to see that our dental impress is made upon this mould. We must furnish in future more literature for the people than we have heretofore done. The people have not the means of informing themselves in regard to the importance of the preservation of their teeth, hence we are not appreciated as we should be. Whenever we furnish the masses with such information as will demonstrate the fact that time and means spent in the preservation of their teeth is economy, we will be looked up to as great benefactors of the human family, and our days of harvest will come. It is in the power of this national society, to do very much in the way of educating the people up to a standard of appreciation of their teeth. This is our tenth annual meeting; let us take hold of this subject with renewed energy, and see if we can not do more than we have heretofore. We have at present about four hundred members, (with an annual increase of about twenty-five,) whose annual dues alone amount to more than two thousand dollars, all of which, except just enough to pay necessary expenses of holding our meetings, I propose to convert into a literary fund, for the purpose of establishing a journal, as well as getting up other literature for the people. If Dr. Hall, of New York, can carry on a health journal, which he has done for many years, I see no

reason why this, the largest dental society on the continent, can not do likewise. A small amount appropriated annually for a few years will enable some one of our profession to take hold of such a journal and make it a profitable enterprise. I dare-say we have a good many literary gentlemen who are somewhat advanced in age that would prefer a living made in this way to one at the chair or in the laboratory. I feel confident that a journal of this sort, established upon a wholesome basis, would very soon become self-sustaining. I think it can be furnished to subscribers at one dollar or one and a half a year, which will enable every regular practitioner of dentistry to take from a half to a dozen copies annually, besides he will not be slow in getting all of his patrons and acquaintances to become regular subscribers, from the fact that he will very soon find it to be decidedly the best as well as the cheapest advertising he can do. It is evident to me that any good dental practitioner can establish a practice much more rapid as well as permanent by keeping up a constant circulation of a first-class people's dental journal in the community in which he proposes to practice, than by any other method of advertising. In fact, one dollar spent in this way will be equal to ten otherwise, and just here I will say no brother need be afraid of another preferring charges against him for advertising in this way, for I am sure our code of ethics will not sustain one in so doing. In addition to a people's first class dental journal, I am, as the most of you know, for I have been advocating it for six or eight years, in favor of introducing dental lessons in school books. In this way we can, in my opinion, accomplish much more than every otherwise. With our journal we can accomplish much. It will enable us to reach a great many, especially those seeking information of this character. But our dental lessons in school-books will enable us to reach the entire masses; not only that, but the mind when it is best calculated to receive our dental impress. This, gentlemen, is the time to exert ourselves in contributing our little mite for the

great mind mould above mentioned. It is the time when all minds are indelibly impressed for good or bad. Many of our best Sunday-school authors say, give them the children of the country until they are eight or ten years of age, and Satan may have them afterwards if he can get them. So we may say when we have furnished the masses with as much literature for schools and other purposes as they have done. They have taken sufficient reflection upon the press to understand and appreciate the fact that it is the greatest lever power that has ever been placed in the hands of man for the purpose of educating himself. Hence they do not hesitate to avail themselves of the advantage of printer's ink, and to do this effectually they understand and appreciate another fact, and that is that it must be done in early life, while the mind is taking its cast, to fit and prepare it for future labor. With these great lights and demonstrations before us, why should we hesitate to go on and get up our dental catechisms and other lessons for school-books, and teach the children until they are ten or fifteen years of age, by which time we will have such a hold upon them that nothing short of death will remove them from us.

This or something else must be done. Our salvation as one of the best and noblest professions on earth depends upon our exertions to demonstrate to the masses the value and importance of their teeth, as well as the way and means of preserving them. This done and we will not only save this and the next generation, but our dental impress will be indelibly fixed upon the mind, to be handed down for improvement as it passes from one generation to another.

DISCUSSIONS ON DENTAL EDUCATION.

Dr. Allen: I can not express the emotions I feel on comparing the present with the past. When I was young I had no resources. Then there was but one work published on dentistry, and that an inferior one, by S. S. Fitch, though it should be entered to his credit. Now we have many large volumes and dental journals. We have nine dental colleges and seventy or eighty associations. It makes me feel that we are progressing. But as we *get* more light we *want* more. The point I wish to advance here is that we ought to carry all departments forward alike. While we have looked at the natural, we have neglected the artificial teeth. We have been so taken up with operative dentistry that we have retrograded here. Artificial dentistry has not advanced *pari passu* with operative. We should endeavor to carry all the branches along together, and not neglect any one.

Dr. J. Taft: This is a subject in which I am deeply interested. It should thrill the soul of every one who is interested in the progress of our profession. Three aspects present themselves in reference to the future of our profession. Shall those who follow us be like us? Shall they be better, or shall they be worse? We ought to see that proper preparation shall be made for the time to come. Many of us are getting old and will soon have passed away. We should see that there be those who are ready to take up the mantle we have dropped. When we look around the world and see what revolutions suddenly arise, we are astonished. We know not what changes may take place in our science. We are using all our endeavors to perfect ourselves, but something more is needed. There should be in every one of us a yearning desire to do all the good we can for those who come after us. I have labored in my weak way toward the advancement of our profession. Now we have periodicals, but they reach but about three thousand dentists. We have eighty associations and one thousand will count all their members. Can not some

transforming influence be made to reach the others? Various methods have been suggested. This association has fostered local societies. Through the agency of a committee appointed by it, forty or fifty societies have been formed. We ought to have gone on and kept this up. Something of this sort might be effected: appoint a committee to go out and organize normal classes and stimulate the profession. It seems to me something in this direction might be done to produce an affinity and attract members of the profession to each other and build up associations. My earnest desire is that the best may be done.

Dr. S. B. Palmer: In reference to publishing the journals, you will find some advertising element in them which they should not have. We ought to have one issued for the people from this association free from pecuniary advantage.

Dr. Crouse said that he had gained more information from dental associations than he ever gained at a dental college, where they have one demonstrator to twenty operators, or under his preceptor, where he worked rubber all the time. He was convinced that when a young man comes from a dental college, though he had been flattered until he thought he was perfect, yet he was not fitted to practice his profession understandingly.

REPORT UPON HISTOLOGY AND MICROSCOPY.

BY HOMER JUDD, D. D. S.

Read before the American Dental Association.

We find upon referring to the Transactions of the Association that only one written report upon this subject has been submitted since a Committee on Histology has been added to the list of standing Committees. In the absence of regular consecutive reports upon this subject, it has been deemed best by the Committee not to confine themselves strictly to the developments of the past year, thinking that it might better sub-

serve the interests of the Association to refer briefly to some of the most important observations that have been made since our most common text books upon this subject have been written.

Of all the structures which have engaged the attention of microscopists during the last few years, no one has attracted more attention than the white blood corpuscle.

The comparatively small number of these elements found in the blood, the little importance hitherto attached to them, the difficulties attending their investigation, and the general ignorance existing in relation to their whole history, had for a long time sufficed to discourage any critical study of their habits, their changes, or their relations to other similar bodies which were supposed, on account of their locations and surrounding circumstances, to be genetically and functionally alien to them.

Virchow first declared that there was no morphological difference between the white blood corpuscle and pus corpuscle which could be discovered by the microscope.

Von Recklinghausen discovered the contractile property of pus cells, and declared that by virtue of this property they possessed the faculty of locomotion.

The same author had also observed that similar bodies existed in normal connective tissue, and that these were also endowed with contractile properties, by which they were enabled to change their forms and even their locations; which fact having been well established, they were designated by some authors as the wandering cells.

The observations of Conheim followed, and the demonstration of the identity of the white blood corpuscle and pus corpuscle was made complete.

One generalization farther and lymph corpuscles, mucous corpuscles and the inflammatory exudation corpuscle were received into the same category and recognized as belonging to the same family, probably emanating from the same source.

But the importance of these discoveries were by no means equal to others which soon followed.

The idea seems to have first occurred to von Recklinghausen that these leucocytic elements had something to do with the organization of fibrinous exudations and of thrombi, and Virchow soon enunciated the doctrine which recognized the white blood corpuscle as the organizer of the clot in a tied blood vessel.

He attributed this function, however, to the white cells inclosed within the clot, but farther investigation seems to indicate that this is not the case, but that the process of organization is carried on only by the leucocytes furnished by the circulating blood, and which pass through the walls of the vasa vasorum to the clot, and that those which are inclosed in the clot itself are incapable of performing any vital action.

Still later observations make it appear probable that, strictly speaking, the clot itself does not become organized, but that there is organized behind the clot a mass of connective tissue which effectually seals up the vessel, and that the only action of the clot itself is the physical one of protecting the organizing mass from the influence of the blood circulating in the vessel, the organization being carried on in the same manner as in exudations from wounds and inflammations in other locations. In reference to the way in which these organizations are brought about, it has been observed that in the exudation which takes place, leucocytes are first seen in the clear fluid, having migrated there in a few hours after the reception of a wound.

The cells change their characteristics, become much larger with large nuclei, and afterwards assume the form of spindle shaped cells, which lie side by side, and finally are wrought out into the fibrous elements of ordinary connective tissue.

These details have been principally worked out by Aufrecht by a series of carefully conducted experiments upon

different animals. The microscope has also been busily engaged in endeavoring to solve the mystery which hangs over the birth and parentage of these important elements of the blood. It is generally supposed that they have their origin in the lymphatic ganglia and the spleen, and some have claimed that they are formed in the liver and even in the muscles; but absolute demonstration upon this point is still wanting.

Dr. Klien states that he has seen white corpuscles multiplying themselves in at least three different ways; by fission, by a process similar to that described by authors as budding, and by a "pinching off" process, as he calls it, in which a piece of the protoplasm is separated from the mass and is soon developed into a complete leucocyte. We can therefore readily account (says the editor of the *Lancet*) for the rapid multiplication of pus cells in abscess.

But the red corpuscles have not altogether been neglected. We learn from the *Monthly Microscopal Journal* that a paper has been submitted to the French Academy by MM. Brechamp and Eston, in which it is claimed that they have demonstrated that the red corpuscle is not a homogeneous mass, but that it is made up of a multitude of specific elements or granules, each one of which is capable of a separate development.

They affirm that when the corpuscles are broken up and these elements set free, they have an independent oscillatory motion; that they act like ferments, and that these microferments give rise to cells like leucocytes.

We may therefore finally discover that the white corpuscles are derived first from the red globules, though this would be widely divergent from the generally accepted doctrine, which would change a white corpuscle into a red one.

The microscope has also been usefully employed in attempting to solve the many questions which have reference to the influence exerted by parasites in the production of disease. The subject is attended with so many difficulties

that progress in this direction does not seem to keep pace with that witnessed in many other fields of research; but the impetus given to experimentation upon the subject by the establishment of the *Zeitschrift für parasitenkunde*, an able quarterly journal, devoted exclusively to the study of parasites and parasitic affections, it is to be hoped will yet put us in possession of many facts relating to the causes of disease that will prove of much service to scientific medicine.

In relation to the histology of the dental tissues, we would remark that at least one important step has been gained during the last year towards the demonstration of nerve fibre in the dentinal tubuli.

Boll, a German microscopist, has succeeded in tracing the nerve fibres of the pulp of a tooth between the cellular elements which form the periphery of the pulp to the very openings into the dentinal tubuli.

It must be borne in mind that former observers had come to the conclusion that the nerve fibres of the pulp terminated at or about the line of junction of the membrana eboris of Kölliker, and the vascular portion of the pulp, that is to say, it was held that the nerve fibril did not penetrate the cellular layer which formed the periphery of the pulp.

Beale first showed that the nerves did penetrate this layer, but as his attention was not particularly drawn to this point, he failed to trace them through this cellular layer up to the openings of the dentinal tubuli, as Boll has succeeded in doing.

Although the nerve fibres have been traced to the very openings of the tubuli, and although it has also been clearly demonstrated that they project still farther, seemingly in the very direction that would carry them into the tubuli; yet it is not claimed by Boll that the demonstration is yet complete, as it might be possible that these projecting fibres might have deflected laterally at this very point, along the surface of the cellular layer, and that in the specimens showing the pro-

jecting fibres these may not have been drawn from the tubuli, as they seem to have been.

The author does not hesitate, however, to declare that he has no doubt whatever but that these nerve fibres were withdrawn from the tubuli.

The extreme care taken by this observer not to claim anything as demonstrated whilst a single link is wanting in the chain of evidence, contrasts strongly with the course pursued by the many superficial experimenters, who frequently jump at conclusions which have but very few even of the characteristics of probability, and which the most superficial examination would at once show were not worthy of a moment's attention by scientific men.

Boll comes, however, somewhat hastily to the conclusion that as he has demonstrated there are two different kinds of processes projected from the surface of a pulp, separated from the dentine, there are probably two different kinds of tubuli for them to pass into, one for the nerve fibre and one for the soft process of the odontoblast, or cell of the cellular layer, but he does not claim that this has been demonstrated, nor does he adduce any special argument in its favor.

We should be inclined to regard this as an entirely unauthorized assumption. We must bear in mind the fact that the processes of the odontoblast are very much larger than the finest pale nervé fibres, and as has been already shown that the nerve fibres pass up from the vascular portion of the pulp between these elongated cells, although the cells seem to be placed closely together, so we may well suppose that these fibres continue to pass up by the side of the processes of the cells which extend into the tubuli. This opinion is strengthened by considering that there is an abundance of room for these fine nerve fibres to ramify upon the membrane which doubtless lines the inner surface of the tubular wall, without interfering with the soft fibre within the tubuli.

It is true that in the illustrations furnished of these two varieties of projecting fibres the nerve fibre is shown to project at a short distance from the side of the soft cell process, but as only a small proportion of the soft fibres are drawn out of the tubuli, the greater number breaking off at the extremity of the odontoblast, this furnishes no evidence opposed to the proposition submitted above.

Many other subjects of much interest in their relations to microscopical science seemed to invite the attention of the Committee, but they did not deem it best to extend the report farther than was absolutely necessary to give a brief résumé of a few of the most important developments which have been brought out in the last few years.

REPORT OF THE COMMITTEE ON MECHANICAL DENTISTRY.

Your committee on artificial dentures submit the following brief report, which by no means is an embodiment of the progress and invention, the principles and practices, which the subject demands.

The absence of the regularly appointed committee (with one exception), and the limited time between filling the committee and the calling for their report, precludes the possibility of doing the subject justice or the committee credit. We deplore the conditions which compel humanity to resort to artificial dentures, and we hail with joy the indications and achievements which promise in the future to preserve to man his dental organs in their normal condition. Yet for generations to come, do all we can, be faithful as we may, poverty, inherent decay or neglect will furnish fit subjects for this specialty of our profession.

In the early days of dentistry this branch was connected with the operative department, and received an equal share of attention, respectability and skill.

We all agree it is more to our credit to preserve the natural organs than to supply their vacant places with artificial ones, and from this creditable distinction has grown up a division, resulting in credit to the operative and discredit to the mechanical. The former absorbing the best talent, naturally becomes elevated. The latter by additions of ignorant manipulators and the too general use of base materials, has received if not earned for itself the unenviable character it sustains.

So long as mechanical dentistry is in demand and receives the place assigned it in the order of business, your committee recommend that this department of dentistry receive its due proportion of consideration.

Circumstances forbid the mention of all the materials or methods employed in constructing artificial dentures. Such only as have been tested or are best known to your committee are here entertained; a single day being insufficient to make satisfactory investigations; and let it be distinctly understood that patents or prejudices, licenses or royalties, are matters outside of our line of duty and consequently are in no way considered in this report. Continuous gum work on platinum base for full dentures or for those cases for which it is adapted is too well known to need the endorsement of this committee, and gold as a base (though it fails to so closely represent nature), for its durability and adaptation to partial cases must be ranked with the above as a first class material.

It can not be denied that there are conditions and circumstances which demand other styles of work or materials less expensive. Some substance easy of manipulation, free from decomposition, chemical or galvanic action. Silver and gold have occupied such positions without fulfilling these requirements. Silver has passed away and is now almost forgotten; and if we rightly judge from the discussions on dental pathology during this session, rubber, too, will soon be no more. "The hand-writing on the wall" bespeaks its doom and predicts for it a reputation for evil which will long curse its memory. What, then, have we to take its place? Rose

pearl and cast aluminum only have been presented to the Association. Each of these, by their proper representatives, has been clearly and ably presented to your committee. Beautiful specimens of each are here for your inspection, as well as the apparatus and materials which are used in their construction, and your committee deem it of sufficient importance that this Association be made acquainted with the process of manipulation. Other materials, we doubt not, are equally entitled to our consideration; but they are without representation and too little known to your committee to call for an intelligent opinion.

All of which is most respectfully submitted.

S. B. Palmer,
C. M. Wright,
Thomas T. Moore,
E. Floyd,
Committee.

REPORT OF THE COMMITTEE ON VOLUNTARY ESSAYS.

Mr. President:

Your committee on Voluntary Essays beg leave to report that they have received four papers—one from J. D. White, of Philadelphia, descriptive of a case of discolored dentine, accompanied by a pathological specimen. The author not being a member of the Association, the paper was not received by the body. J. S. Knapp, of New Orleans, presented two valuable papers, one on "The Saving of time in Dental Operations," and the other on "Cylinder Fillings," both of which were listened to with marked interest. The other paper was from C. M. Wright, of Cincinnati, on "Dental Patents." The spirit of this paper was in opposition to the proposed amendment on that subject, and although it met the hearty endorsement of your committee, yet they did not deem it necessary or expedient to present it.

S. H. McCall,
C. D. Cook,
J. Fouche,
Committee.

REPORT ON DENTAL INSTRUMENTS AND APPLIANCES.

Mr. President and Gentlemen of the American Dental Association:

Your committee on Dental Instruments and Appliances respectfully report that during the past year several valuable improvements have been offered to the profession. Among those deemed by us as especially worthy of being presented to the notice of the profession are the following: Green's Pneumatic Burr Engine, and Morrison's Burring Apparatus, one of which must soon become an indispensable adjunct to every dental office. Also Green's Pneumatic Mallet; and in this connection we notice an improvement in Salmon's well known automatic mallet, which has the new attraction of a back action stroke.

Butler's Chair presents an improvement in a new rotary motion, which seems a valuable addition and makes it one of the best. The Morrison Chair is also on hand, and in its facility for placing the patient high or low seems the *ne plus ultra* so far.

Dr. Hollingsworth, of Indianapolis, Ind., presents an apparatus for casting aluminum plates, which seems to be a perfect success, and promises to come to our relief from the "rubber nuisance."

Among several new forms of instruments we notice some excellent ones by Drs. Salmon & Peebles.

Your committee most respectfully suggest to inventors that while the profession are willing to pay a liberal and remunerative price for apparatus which will pay them as far as money can for their labor and thought, that office rights are universally objectionable and we believe less profitable, besides being the source of endless misunderstanding and some times litigation.

We also notice new forms of instruments by Drs. Redman, of Louisville, Varney, of N. Y., and Butler, of Cleveland, that surpass anything before offered to the profession.

Respectfully, J. R. Walker,
Arthur C. Ford,
Committee.

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